

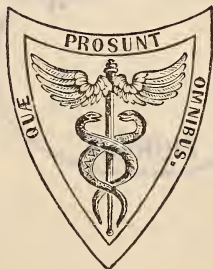
THE
AMERICAN JOURNAL
OF THE
MEDICAL SCIENCES.

EDITED BY
ISAAC HAYS, M.D.,

FELLOW OF THE PHILADELPHIA COLLEGE OF PHYSICIANS; MEMBER OF THE
AMERICAN MEDICAL ASSOCIATION; OF THE AMERICAN PHILOSOPHICAL SOCIETY; OF THE
ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA; ASSOCIATE FELLOW
OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES,
&c. &c. &c.

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TO READERS AND CORRESPONDENTS.

WE must urge upon our contributors the importance of forwarding to us their communications early. Papers intended for the Original department should be on hand at least six weeks, and Reviews one month, before the date of publication. To select and arrange the papers, put them in type, and print off a number of this Journal, require more time than seems to be supposed.

All articles intended for the Original department of this Journal must be communicated to it *exclusively*.

The following works have been received:—

Stimulants and Narcotics, their Mutual Relations. With Special Researches on the Action of Alcohol, Ether, and Chloroform on the Vital Organism. By FRANCIS E. ANSTIE, M. D., M. R. C. P., Asst. Phys. to Westminster Hospital, Lecturer on Materia Medica and Therapeutics in the School, &c. &c. London: Macmillan & Co., 1864.

Transactions of the Obstetrical Society of London. Vol. VI. For the Year 1864. With a List of Officers, Fellows, &c. London: Longman & Co., 1865. (From the Society.)

Optical Defects of the Eye, and their Consequences, Asthenopia and Strabismus. By JOHN ZACHARIAH LAURENCE, F. R. C. S., M. B. (Univ. Lond.), Surgeon to the Ophthalmic Hospital, Southwark, Editor of The Ophthalmic Review, &c. &c. &c. London: Robert Hardwicke, 1865. (From the Author.)

Vital and Economical Statistics of the Hospitals, Infirmaries, &c., of England and Wales, for the Year 1863. By FLEETWOOD BUCKLE, M. D., L. R. C. P., Lond., F. R. Med. and Chir. Soc., &c. London: John Churchill & Sons, 1865.

Lectures on the Pathology and Treatment of Lateral and other Forms of Curvature of the Spine. By WM. ADAMS, F. R. C. S., Surgeon to the Royal Orthopædic and Great Northern Hospital, &c. &c. Delivered at the Grosvenor Place School of Medicine, in the Session 1860-61. Illustrated by Five Lithographic Plates and Sixty-one Wood Engravings. London: John Churchill & Sons, 1865.

For and Against Tobacco; or, Tobacco in its Relations to the Health of Individuals and Communities. By BENJAMIN WARD RICHARDSON, M. A., M. D., Senior Phys. to the Royal Infirmary for Diseases of the Chest. London: John Churchill & Sons, 1865.

Handbook of Skin Diseases, for Students and Practitioners. By THOMAS HILLIER, M. D., London, M. R. C. P., Physician to the Skin Department of University College Hospital, &c. With Illustrations. Philadelphia: Blanchard & Lea, 1865. (From the Publishers.)

The Dispensatory of the United States of America. By GEORGE B. WOOD, M. D., President of the American Philosophical Society and of the College of Physicians of Philadelphia, Emeritus Professor of the Theory and Practice of Medicine in the University of Pennsylvania; and FRANKLIN BACHE, M. D., late

Professor of Chemistry in Jefferson Medical College, late Vice-President of the College of Physicians of Philadelphia, late President of the American Philosophical Society. Twelfth Edition, carefully revised. Philadelphia: J. B. Lippincott & Co., 1865. (From Dr. George B. Wood.)

Contributions to Practical Surgery. By W. H. VAN BUREN, M. D., Professor of Anatomy in the University of New York, &c. &c. Philadelphia: J. B. Lippincott & Co., 1865 (From the Publishers.)

Report of Interesting Surgical Operations performed at the U. S. A. General Hospital, Beverly, New Jersey. By C. WAGNER, Assist. Surg. U. S. A., commanding Hospital. (From the Author.)

The Renewal of Life. Lectures, chiefly Clinical. By THOMAS KING CHAMBERS, M. D., Physician to St. Mary's and the Lock Hospitals. From the Third London Edition. Philadelphia: Lindsay & Blakiston, 1865. (From the Publishers.)

The Physician's Prescription Book: containing Lists of the Terms, Phrases, Contractions, and Abbreviations used in Prescriptions, &c. &c. By JONATHAN PEREIRA, M. D., F. R. S. Fourteenth Edition. Philadelphia: Lindsay & Blakiston, 1865. (From the Publishers.)

A Vest-Pocket Medical Lexicon. Being a Dictionary of the Words, Terms, and Symbols of Medical Science. Collated from the best Authorities, with the Addition of New Words not before introduced into a Lexicon. With an Appendix. By D. B. ST. JOHN ROOSA, M. D., Aural Surgeon to the New York Eye and Ear Infirmary. New York: Wm. Wood & Co., 1865. (From the Publishers.)

The Preparation and Mounting of Microscopic Objects. By THOMAS DAVIES. New York: Wm. Wood & Co. (From the Publishers.)

The Essentials of Materia Medica and Therapeutics. By ALFRED BARING GARROD, M. D., F. R. S., F. R. C. P., Professor of Materia Medica and Therapeutics in King's College, London, &c. &c. New York: Wm. Wood & Co., 1865. (From the Publishers.)

Proceedings of the Academy of Natural Sciences of Philadelphia. January, February, March, 1865.

State of New York. Twenty-second Annual Report of the Managers of the State Lunatic Asylum, for the Year 1864. Transmitted to the Legislature, February 4, 1865. Albany, 1865.

Tenth Annual Report of the Board of Trustees and Officers of the Southern Ohio Lunatic Asylum, to the Governor of the State of Ohio, for the Year 1864. Columbus, 1865.

Annual Report of the Trustees of the Wisconsin State Hospital for the Insane, for the Year ending September 30, 1864.

The Sixth Biennial Report of the Board of Managers of the State Lunatic Asylum, at Fulton, Missouri, together with the Reports of the Superintendent, and Physician, and Treasurer. 1864. Jefferson City, 1865.

Twenty-sixth Annual Report of the Board of Trustees and Officers of the Central Ohio Lunatic Asylum, to the Governor of the State of Ohio, for the Year 1864. Columbus, 1865.

Fifth Annual Report of the Board of Directors and Officers of Longview Asylum, to the Governor of the State of Ohio, for the Year 1864. Columbus, 1865.

Annual Report of the Provost Marshal General. November 15, 1864. (From J. H. Baxter, Surg. U. S. V.)

Annual Report of the City Inspector of the City of New York, for the Years ending December 31, 1862, 1863, and 1864. New York, 1863-4-5. (From Cyrus Ramsay, M. D.)

Report of the Board of Health of the City and Port of Philadelphia, to the Mayor, for 1864. Philadelphia, 1865.

Annual Report of the Trustees of the Wisconsin State Hospital for the Insane, for the Year ending Sept. 30, 1864. (From Dr. A. H. Van Nostrand.)

Forty-eighth Annual Report on the State of the Asylum for the Relief of Persons deprived of the Use of their Reason. Philadelphia, 1865. (From J. H. Worthington, M. D.)

The Army Medical Staff. An Address delivered at the Inauguration of the Dale General Hospital, U. S. A., Worcester, Mass., February 22, 1865. By WARREN WEBSTER, M. D., Assist. Surg. U. S. A., in charge of De Camp General Hospital. Boston, 1865. (From the Author.)

Prize Essay on Gunshot Wounds, particularly those caused by newly-invented missiles. By ALEXANDER BECKER, M. D., of Providence, R. I. (From the Author.)

A Radical Operation for Prolapsus. Read before the New York Obstetrical Society, December 20, 1864. By THOS. ADDIS EMMET, M. D., Surgeon to State Woman's Hospital, New York. New York, 1865. (From the Author.)

Memoir of Thomas Turner, M. D. Read before the Medical Society of the County of Kings, Brooklyn, April, 17, 1865. New York, 1865.

Supplementary Catalogue of the Books belonging to the Library of the New York Hospital. Legacy of John Watson, M. D. New York, 1865.

Catalogue of the Officers and Students of the University of Michigan, with a Statement of the Course of Instruction in the various Departments. 1865. Ann Arbor, 1865.

Catalogue and Circular of the Albany Medical College. Albany, 1864.

The following Journals have been received in exchange:—

Revue de Thérapeutique Médico-Chirurgicale. Rédigé par A. MARTIN LAUZER. Nos. 6, 7, 8, 9, 10. 1865.

Annales Médico-Psychologiques. Par les Docteurs BAILLARGER et CERISE. January, March, July, November, 1864. January, March, 1865. (Nos. for May and September, 1864, never received.)

The British and Foreign Medico-Chirurgical Review. April, 1865.

Medical Times and Gazette. March, April, May, 1865.

British Medical Journal. Nos. 218, 219, 220, 221, 222, 223, 224, 225, 226, 227. 1865.

Edinburgh Medical Journal. March, April, May, 1865.

The Glasgow Medical Journal. April, 1865.

The Ophthalmic Review: a Quarterly Journal of Ophthalmic Surgery and Science. Edited by J. ZACHARIAH LAURENCE, of London, and THOMAS WINDSOR, of Manchester. April, 1865.

The Medical Mirror. March, April, 1865.

The Medical Press. May, 1865.

The Indian Annals of Medical Science. January, 1865.

Medical and Surgical Review. [Australian.] December, 1864. January, 1865.

Canada Medical Journal. Edited by G. E. FENWICK, M. D., and F. W. CAMPBELL, M. D. April, 1865.

The Boston Medical and Surgical Journal. Edited by S. L. ABBOT, M. D., and J. C. WHITE, M. D. April, May, June, 1865.

The Cincinnati Lancet and Observer. Edited by EDW. B. STEVENS, M. D., and J. A. MURPHY, M. D. April, May, June, 1865.

The American Journal of Insanity. Edited by the Medical Officers of the New York State Lunatic Asylum. April, 1865.

Buffalo Medical and Surgical Journal. Edited by JULIUS F. MINER, M. D. April, May, June, 1865.

The New York Medical Journal. April, May, June, 1865.

The St. Louis Medical and Surgical Journal. Edited by M. L. LINTON, M. D., and F. WHITE, M. D. May and June, 1865.

The Chicago Medical Journal. Edited by DE LASKIE MILLER, M. D., and E. INGALS, M. D. April, May, June, 1865.

The Chicago Medical Examiner. Edited by N. S. DAVIS, M. D. March, April, June, 1865.

The Sanitary Commission Bulletin. April, May, June, 1865.

The Sanitary Reporter. April, May, 1865.


The American Journal of Pharmacy. Edited by WILLIAM PROCTER, Jr., M. D. May, 1865.

The American Druggists' Circular and Chemical Gazette. April, May, June, 1865.

Communications intended for publication, and Books for Review, should be sent, *free of expense*, directed to ISAAC HAYS, M. D., Editor of the American Journal of the Medical Sciences, care of Messrs. Blanchard & Lea, Philadelphia. Parcels directed as above, and (carriage paid) under cover, to Messrs. Trübner & Co., Booksellers, No. 60 Paternoster Row, *London, E. C.*; or M. Hector Bossange, Lib. quai Voltaire, No. 11, *Paris*, will reach us safely and without delay. We particularly request the attention of our foreign correspondents to the above, as we are often subjected to unnecessary expense for postage and carriage.

Private communications to the Editor may be addressed to his residence, 1525 Locust Street.

ALL REMITTANCES OF MONEY, and letters on the *business* of the Journal, should be addressed *exclusively* to the publishers, Messrs. Blanchard & Lea.

 The advertisement-sheet belongs to the business department of the Journal, and all communications for it should be made to the publishers.

To secure insertion, all advertisements should be received by the 20th of the previous month.

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- XVIII. Lectures on Epilepsy, Pain, Paralysis, and certain other Disorders of the Nervous System, delivered at the Royal College of Physicians in London. By Charles Bland Radcliffe, M. D., Fellow of the Royal College of Physicians in London, Physician to the Westminster Hospital, &c. London: John Churchill & Sons, 1864. . 121
- XIX. Acupressure: a New Method of Arresting Surgical Hemorrhage, and of Accelerating the Healing of Wounds. By James Y. Simpson, M. D., F. R. S. E., Professor of Medicine in the University of Edinburgh, and Physician Accoucheur to the Queen for Scotland, &c. &c. &c. With Illustrations. Edinburgh, 1864. Demi-octavo, pp. 580. . 130
- XX. Osmosis: the Forces by which it is accomplished, and its Agency in various Physiological and Pathological Processes, and in the Action of Medicines and Poisons.
1. De l'Endosmose des Acides. Par M. Dutrochet, Membre d'Académie des Sciences. Mémoire lu à l'Académie des Sciences le 19 Octobre, 1835.
 2. Endosmosis. By H. Dutrochet, M. D. In Encyclopædia of Anatomy and Physiology, by R. B. Todd, M. D. London, 1837.
 3. Lectures on the Physical Phenomena of Living Beings. By Carlo Matteucci, Professor of the University of Pisa. Translated under the Superintendence of Jonathan Pereira, M. D., Vice-President of the Royal Medical and Chirurgical Society. Philadelphia, 1848. Reprint.

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4. Researches on the Chemistry of Food, and the Motion of the Juices in the Animal Body. By Justus Liebig, M. D., Professor of Chemistry in the University of Giessen. Edited by Wm. Gregory, M. D., Professor of Chemistry in the University of Edinburgh, and Eben N. Horsford, A. M., Rumford Professor in the University of Cambridge. Lowell, 1848.
5. Report on the Laws according to which the Mixing of Fluids and their Penetration into Permeable Substances occur, with Special Reference to the Processes in the Human and Animal Organism. By Julius Vogel. Chemical Reports and Memoirs of the Cavendish Society. London, 1848.
6. On Phial Diffusion. By Prof. Graham. Philosophical Transactions. London, 1850.
7. Liquid Diffusion applied to Analysis. By Thomas Graham, F. R. S., Master of the Mint. Philosophical Transactions, Vol. 151, for 1861.
8. Elements of Inorganic Chemistry. By Thomas Graham, F. R. S. L. and E. Edited by Henry Watts, B. A., F. C. S., and Robert Bridges, M. D. Second American Edition. 1858. Chapter "Osmose." . . . 135
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- XXII. Medico-Chirurgical Transactions. Published by the Royal Medical and Chirurgical Society of London. Second Series. Volume the Twentieth. London, 1864. 8vo. pp. 447. . . . 162

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2. Annual Report of the Surgeon-General, for the Year 1864, made to the Governor of the State of Ohio. Columbus, Ohio, 1863. 8vo. pp. 87.
3. Annual Report of the Provost Marshal General. November, 15, 1864. With Five Large Tables. 8vo. pp. 49.
4. Report to the Western Sanitary Commission on the General Military Hospitals of St. Louis, Mo. Presented August 1, 1862. St. Louis, 1862. 8vo. pp. 76.
5. Report of the General Superintendent of the Philadelphia Branch of the U. S. Sanitary Commission to the Executive Committee, January 1, 1865. 8vo. pp. 51. . . . 171
- XXIV. The Dispensatory of the United States of America. By George B. Wood, M. D., President of the American Philosophical Society, President of the College of Physicians of Philadelphia, Emeritus Professor of the Theory and Practice of Medicine in the University of Pennsylvania, &c., and Franklin Bache, M. D., late Professor of Chemistry in Jefferson Medical College of Philadelphia, late Vice-President of the College of Physicians of Philadelphia, late President of the American Philosophical Society, &c. &c. Twelfth Edition, carefully revised. Philadelphia: J. B. Lippincott & Co., 1865. 8vo. pp. 1704. . . . 180
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ART. I.—*On Contusion and Contused Wounds of Bone, with an Account of Thirteen Cases.* By JOHN A. LIDELL, A. M., M. D., Surg. U. S. Vols., Inspector Med. and Hospital Department Army of the Potomac.

THE osseous framework of the human body is exposed to a considerable variety of lesions occasioned by violence; and, if we inquire at length into the causation of these injuries, it will be found that they are the necessary results or products of physical forces brought into activity by accidents, by design, or by war. The traumatic lesions of bone embrace a wide field, and present a subject of deep interest to every surgeon. An enumeration of the most important of them will assist us to estimate aright the extent and importance of the subject. Considered apart from the injury of the soft parts with which these osseous lesions may be accompanied, they embrace *firstly, simple fracture; secondly, comminuted fracture, i. e., fracture with splintering, shattering, or crushing of the broken bone, and thirdly, wounds of bone.* The term fracture can, with propriety, be applied only to a forcible solution of the continuity which extends through the whole thickness of a bone; while the term wounds of bone embraces those other solutions of the osseous continuity, occasioned by violence, which do not extend through the whole thickness of it.

The wounds of bone are analogous to the wounds of the soft parts, and, like them, may be classified as follows: First, *incised wounds*, of which familiar examples are afforded by a cut into the tarsus inflicted with the sharp edge of an axe, or by a piece of the skull shaved off with a sharp sabre or cutlass. Second, *lacerated wounds*, an example of which is afforded by the coronoid process of the ulna when torn off by the action of the brachialis anticus muscle. This form of injury may be denominated a lacerated wound of the ulna, or a fracture of the coronoid process. Ano-

ther example of this lesion is afforded by a long splinter torn off from the side of a long bone by a rifle-ball. Third, *contused and lacerated wounds*, such as a groove or furrow ploughed on the surface of a bone by a musket-bullet. Fourth, *contused wounds*, properly so called, examples of which are produced by glancing balls, by spent balls, and by severe blows with any blunt instrument, whereby the external compact layer of a bone becomes cracked and perhaps indented also, while the investing periosteum and the underlying osseous tissue, at the same time, receive an injury in the nature of a bruise. Fifth, *perforating wounds*, such as, for example, a hole bored through the whole thickness of a bone by a gimlet or drill. Rifle-balls also sometimes pass through the condyles of the femur, the head of the tibia, and other portions of the osseous system, in such a way as to produce examples of this kind of injury. Sixth, *penetrating wounds*, instances of which are not unfrequently produced by small arms, as when a bullet passes through the body of a vertebra and lodges in the spinal canal, or penetrates the shaft of a long bone and lodges in the marrow, or penetrates its spongy epiphysis and lodges in the cancellous structure.

Besides the various forms of solution in the continuity of bone enumerated above, the osseous tissue is liable to be injured by violence in two other ways; viz., during the infantile period of life and before the calcification of the osseous tissue is far advanced, any of the long bones may be forcibly bent without fracture, numerous examples of which are on record; and, in the second place, *the osseous tissue is liable to be bruised*, there being, at the same time, no manifest disruption of the external compact layer, or any other part of the bone involved—a form of injury not unfrequently inflicted by spent musket-balls, by glancing musket-balls, and by the kicks of horses or mules. This kind of injury of the osseous tissue is properly known as *contusion of bone*.

For the purposes of clinical study and investigation, all the cases of traumatic lesion of the osseous tissue may be conveniently arranged in three principal groups. First, injury without solution of the continuity, *e. g.*, the contusion and the bending of bone. Second, partial solutions of the continuity, *e. g.*, the various wounds of bone; and third, complete solutions of the continuity, *e. g.*, fracture. By pursuing this course we are enabled to keep the extent and magnitude of the subject constantly before our minds, and, at the same time, devote ourselves to the study of any part of it without embarrassment.

The pathological history of contusion of bone will constitute essentially the theme of this paper. It is a subject which, heretofore, seems not to have attracted much attention. Nearly all of the systematic works on surgery, in common use in this country, such as those of Gross, Druitt, Smith, Ferguson, Miller, and Chelius by South, make no mention of it whatever. Mr. Erichsen alone gives a brief account of it. Even in the books devoted to a special discussion of the diseases and injuries of the

osseous system it is entirely overlooked. Mr. Stanley,¹ in his valuable work on the bones, and Mr. Paget, in his admirable lectures on surgical pathology, do not make any allusion to such a pathological condition of the osseous tissue as contusion. The writers on military surgery, for example, the late Mr. Guthrie, Dr. Macleod, Mr. Longmore, Dr. Williamson, Sir George Ballingall, and Dr. Hennen are equally silent on this subject in their respective works. Dr. Stromeyer, however, forms an exception, as he speaks of it while describing the action of bullets on the bone. He says:—

“They strike the bone without breaking it, and flatten themselves against its surface; the bone struck becomes necrotic from the destruction of its periosteum. In crowded hospitals such injuries of the larger long bones cause supuration of the medullary canal, which, extending itself, at last by the passage of pus into the veins gives a fatal termination. In the autopsy (the bone being sawn in its long axis) the marrow is found filled with pus from the wounded part upward, and the same morbid product in the neighboring large veins, as in the femoral vein after contusion of the femur.

“The spot struck by the ball is colourless and exsanguine; in its circumference appears the commencement of a line of demarcation. Contusions of this kind, which, up to the present time, have been but little attended to in the long bones, are well known in the bones of the skull; when caused by a blow or fall, they have the same dangerous consequences, if not properly treated, as suppuration occurs in the diploe and purulent inflammation in the sinuses, with its usual results. Such contusions also occur in the cranial bones if a bullet strikes at a right angle, of which I have seen many examples, where it could be determined from the character of the wound in the soft parts that the same had been so struck without causing fracture or depression of the bone.”—Vide *Statham's Stromeyer*, pp. 12 and 13, American edition.

But while Stromeyer thus distinctly recognizes the occurrence of contusion of bone, and, furthermore, that it is a lesion often fraught with great danger to life, he does not enter upon any extended discussion of the subject. He speaks of this form of contusion as he has seen it in the shafts of the long bones and in the bones of the cranium, but without the mention of any others. He does not attempt to point out the several varieties of osseous contusions, although they differ from each other very much, both in respect to phenomena and results. Nevertheless, he is entitled to no small amount of credit for having clearly pointed out the great danger to life which pertains to many cases of this kind of injury.

THE CONSEQUENCES OF CONTUSION OF BONE. *First. Ecchymosis of the Osseous Tissue.*—As already indicated above we find on investigation that the phenomena of the kind of injury under consideration do not, by any means, present a uniform character. They vary a good deal, according to the situation, structure, and vitality of the bone which happens to be bruised. For example, a contusion of the bones of the face (*cæteris*

¹ This statement is made from memory alone so far as Mr. Stanley's book is concerned, and here in the field, where this paper is being prepared, it is impossible to verify the statement by referring to the book itself.

paribus), is much more likely to do well than a contusion of the pelvic bones, and a contusion of the humerus than a contusion of the femur. This fact should, without doubt, be attributed to the superior supply of blood, and to the superior vitality which belongs to the osseous tissue in the upper part of the body when compared with that in the lower part of the organism. The structure of the injured bone itself has also an important bearing upon the pathological condition produced by the contusing force. For this reason the marks of a bruise are much more obvious from the very outset in a bone having a loose spongy structure, such as the condyloid epiphysis of the femur, than in one which is principally made up of compact tissue such as the diaphysis of the same bone. Furthermore, the pathological appearances produced by contusion in the spongy or cancellous osseous tissue bear a much stronger resemblance to a bruise of the soft parts, than the pathological appearances produced by contusion in the compact osseous tissue. This interesting fact tends to confirm the propriety of studying the lesions of bone by the light afforded from analogous lesions of the soft parts. Now, contusion of the soft tissues is always associated with an extravasation of blood into the meshes of the areolar tissue, called ecchymosis. This takes place from the capillary bloodvessels which happen to be ruptured by the contusing force. In like manner contusion of any bone having a spongy structure, such as the inferior epiphysis of the femur, *may* also be accompanied by an ecchymosed appearance of the bruised osseous tissue, occasioned by the extravasation of blood into the cancelli from the capillary vessels, which chance to be ruptured by the commotion among the osseous particles set up by the contusing force. The following case affords a good illustration of this point.

CASE I. *Gunshot wound of the left knee-joint with contusion of the internal condyle of the femur; ecchymosis of bruised osseous tissue; traumatic arthritis; secondary amputation of the thigh; recovery.*—Private Jacob Kimm, Co. E, 152d New York Vols., aged 21 years, and of good constitution, was admitted to Stanton General Hospital, June 4th, 1864, from the field, having received a severe gunshot wound of the left knee-joint, four days previously, May 31st, near Salem Church, Va. A rifle ball penetrated that joint from the front. There was no orifice of exit. He said the ball had not been extracted, and it was therefore supposed to be still lodged somewhere on the inside.

June 6. The knee is much swelled, painful, hot, and tender. The periarticular tissues are thickened by serous infiltration. The thigh, also, is moderately swelled; and the femoral tumefaction is increasing from day to day in spite of quietude, and a free application of ice to the inflamed parts. A thin and dirty looking pus mixed with synovia flows from the wound. On introducing my finger, the patient being etherized, the interior of the joint is readily explored in various directions, but without discovering the bullet or finding any comminution of the bone. His general condition is favourable. The constitutional disturbance (irritative fever) is but slight, having not yet been fully developed. There being no prospect of saving the limb the thigh was amputated this day by the double-flap

method about the junction of the middle with the inferior third; anæsthetic sulphuric ether. The loss of blood was small. But little shock attended the operation, and he reacted promptly after it. The subcutaneous areolar tissue was œdematous at the place of operation.

The after-treatment presented no difficulty. The stump united by granulation. The convalescence was rather slow, but satisfactory in every other respect.

Oct. 10. He has a good stump and expects to be discharged from the service in a short time.

The examination of the amputated member showed that the bullet had penetrated the joint, struck against the fore-part of the internal condyle of the femur and *bruised* it. But the projectile was not found in the joint or any of the neighbouring parts, and, therefore, it is supposed that it had either fallen out spontaneously, or had been withdrawn by the clothing. It was doubtless a spent ball. The synovial membrane was reddened (inflamed) throughout its whole extent. The synovial fringes exhibited the greatest amount of the reddening. The joint contained a quantity of thin, dirty-looking, flaky pus. The bone was not broken nor indented at the spot where the bullet impinged against it, but was only *bruised*. On sawing through the seat of the *contusion* the cancellous structure was found to exhibit pretty *extensive ecchymosis* in that locality. This *ecchymosed patch* was about an inch in diameter by something more than half an inch in depth. This *bruised* portion of the femoral condyle blackened by the extravasation of blood into its cancelli was surrounded by a sharply defined margin, which separated it from the healthy osseous tissue lying exterior to it.

In this man's case but six days elapsed between the infliction of the injury and the amputation of the injured member. This brief interval afforded too little time to allow any considerable development of the after-phenomena peculiar to ecchymosis of bone. But it is sufficiently obvious, that, whatever science may have lost from not delaying the amputation till a later period, the patient himself gained in the additional security to his life obtained thereby, since the knee-joint was involved in the traumatic lesion. It is, however, not difficult to conjecture some of the terminations which must follow after ecchymosis of bone, if we permit our reflections to be guided by the general analogy which obtains between ecchymosis of the osseous and ecchymosis of the soft tissues, and provided that we also make the necessary allowances for the differences in anatomical structure pertaining to the osseous and the soft tissues, and for the modifications in morbid action consequent thereon, being careful to pursue our reflections in a strictly philosophical spirit. For example, there is good reason to believe that the so-called interstitial absorption of the extravasated blood may take place spontaneously in some cases of ecchymosed bone, as well as it does in most cases of ecchymosed soft parts, and that in this way the lesion may terminate directly in recovery without the intervention of any morbid process whatever; or, in other words, it is possible that ecchymosis of bone may terminate spontaneously by resolution through the activity of certain of the normal physiological processes alone. Something analogous to this

we sometimes see, when a small ecchymotic extravasation of blood has occurred beneath one of the finger nails from a slight bruise. In such a case it happens that the overlying nail does *not die*, but the extravasated blood itself begins to disappear at the circumference of the bruise, and this process continues until the discoloration is wholly removed. And not the least interesting feature in such a case is, that we can readily see through the semi-transparent nail the progress towards recovery by resolution of an extravasation of blood beneath dense tissue, from one day to another.¹

But there is also good reason to believe that ecchymosis of bone is not always attended with so fortunate a result. Now, in a case of *severe contusion* of any of the porous or spongy bones it is obvious that the quantity of blood extravasated into the cancelli of the bruised osseous tissue would be materially increased in such a way as to bear some relation to the severity of the contusion, and it is not difficult to conceive that the increased volume of the sanguineous effusion might be so great as to fill up the cancelli and the minute canals of the bruised part of the bone completely, and the tendency (*vis à tergo*) to extravasate continuing would extend the disastrous effects beyond this, and might even compress effectually the nutrient capillary bloodvessels against the hard unyielding osseous partitions, plates, and laminae in relation with which, and in the midst of which they course along, and thus cut off completely the supply of blood to the ecchymosed osseous tissue. In this way the nutrition of the bruised portion of bone would be arrested, and a morbid condition, a necrosis, a dry gangrene of bone, analogous to senile gangrene of the soft parts, would be produced. In this way the blood extravasated into the cancelli, and the interspaces of bruised osseous tissue would destroy the vitality of that tissue as effectually as the products of inflammatory action sometimes do when they are suddenly effused into the interior structure of bone. In both alike necrosis is produced, and the inability on the part of the calcified osteine to stretch and yield, and thus permit swelling to take place so as to save the interior nutrient bloodvessels from compression, is mainly chargeable with its production.

The following case has an important bearing upon this part of the discussion. It affords a striking example of circumscribed necrosis, produced by the extravasation of blood into the porous structure of the inferior epiphysis of the femur. It shows, further, that the osseous tissue, whose vitality has been destroyed in this way, acts as a mechanical irritant upon the contiguous structure just like any foreign body; and that it may kindle in them an inflammatory action of great severity and of a fatal character.

¹ There is reason to believe that ecchymosis of bone from contusion occurs much more frequently than at first sight would be supposed; and that its termination by resolution accounts for the fact that it very often evades the surgeon's notice.

CASE II. *Contusion of the external condyle of the left femur inflicted by a glancing bullet, followed by severe inflammation of the knee-joint, although it had not been penetrated by the bullet; death from exhaustion after thirty-six days: ecchymosis of the bruised osseous tissue found at the autopsy.*—Private Thomas Pryor, Co. "H," 18th Mass. Vols., aged 19 years, was admitted to Stanton General Hospital, May 25, 1864, from the field, having been wounded at the battle of the Wilderness, May 5th, twenty days before, by a glancing minie-ball, which caused a superficial wound of the skin, and subcutaneous areolar tissue on the outer side of the left knee; but the joint was not opened by it.

He exhibited all the local symptoms of a *very severe inflammation of that joint*, besides which he suffered much constitutional disturbance in the shape of a *very low form of irritative fever*, and died of exhaustion, June 10th.

It was found at the autopsy that the *external condyle* of the left femur was *contused by the glancing bullet*, although the synovial sac was not penetrated by it. The *contused bone exhibited well-marked ecchymosis* through a circular space about one inch in diameter by three-fourths of an inch in depth, *and was surrounded by a distinct line of demarcation*, which was clearly shown by sawing through it. The contused portion of bone had a dark reddish-brown color. The interior structure of the epiphysis in general was redder than natural.

This case, reported at greater length, can be found in the last number of *The American Journal of the Medical Sciences*, Vol. XLIX. It is again introduced in this place, because it affords an apt illustration of the views just now expressed concerning ecchymosis of bone terminating in necrosis. Here we see an example wherein the extravasation of blood into the tissue of a spongy bone, occasioned by a bruise, was sufficient to arrest the supply of nutritive material to that portion of bone; and, in this way, deprive it of vitality, as has already been pointed out. Here we further see an example of the destructive results which may speedily follow necrotic ecchymosis of bone occasioned by severe contusion. The dead bone itself, like a foreign body, irritates the surrounding parts, and kindles in them an inflammatory condition as destructive to life as it is violent and prolonged.

The Second Important Consequence of Contusion of Bone which demands our attention is Ecchymosis of the Medullary Tissue.—This pathological condition is found only in the marrow of the long bones, and seems not to be accompanied by ecchymosis of the neighbouring osseous tissue; at least, this rule has obtained, in the several cases which have come under the writer's observation. While ecchymosis of the osseous tissue itself is confined to the spongy epiphyses, so far as the long bones are concerned, ecchymosis of the marrow is restricted to the limits of their diaphyses. It may, with propriety, be stated in a general way in this place, that the phenomena of contusion of the shaft of the long bones are somewhat different from those which pertain to contusion of bones having a spongy

or cancellous structure. The phenomena pertaining to the latter have already been considered at sufficient length. Now, when the shaft of any long bone, the compact tissue of which is very dense, and embraces the whole thickness unto the medullary canal, suffers contusion, no appearance of ecchymosis, appreciable to the unaided vision, will be discovered in the osseous tissue itself, on account of its want of sufficient porosity; but, at the same time, the commotion occasioned by the contusing force may be propagated inwards to the medullary canal, the capillary vessels therein may be ruptured by the force so propagated, and blood in abundant quantity may be extravasated into the marrow, causing it to present a bruised appearance. This is precisely what we have met with in several instances; and the following is a case in point.

CASE III. *Gunshot wound through calf of left leg; contusion of fibula with simple longitudinal fissure and extravasation of blood in the marrow; death thirty-five days afterwards from exhaustion.* Reported by Frederick Rorback, Medical Cadet, U. S. A.—Private James Sted, Co. "F," 20th Michigan Vols., aged 27, constitution apparently not vigorous, was admitted to Stanton General Hospital, July 4, 1864, suffering from a gunshot wound through the calf of the left leg, the missile being a minie-ball which had passed in close relation to the fibula. The wound had been received, June 28th, in front of Petersburg. At time of admission the orifice on the outer side of the leg presented a sloughy appearance. The one on the inner side also looked sloughy, but not so much so. Subsequently, the wound was treated with a solution of permanganate of potassa, under which it soon cleaned off, and the entire surface assumed a healthy granulating appearance.

At time of admission the patient's general condition was fair; but he was rather weak and debilitated. His appetite, however, was good. Quietude was enjoined, and nutrients and tonics were prescribed.

On the 5th, and again on the 12th of July, his bowels being torpid were moved by Sal. Rochelle. At this time stimulants began to be sparingly administered, as he appeared to be failing.

July 19. He was obviously much worse (asthenic), and complained of having a great deal of pain in the wounded parts. Milk-punch in very liberal quantity (so as to take 3iss of spiritus frumenti every three hours), and pil. opii gr. j every four hours, were prescribed.

28th. His bowels became obstinately constipated. He continued to sink, and died, August 1st, of exhaustion. He did not have chills or febrile movement at any time; but slowly pined away, and died.

The autopsy disclosed the fact that the bullet had *bruised the fibula* on its outer surface at the upper third (junction with middle). Here the periosteum was reddened, thickened, loosened, and could be stripped off very readily for a distance of about three inches, but it was not yet completely separated. The osseous surface itself was considerably redder than natural, and roughened over the same space. The compact tissue was fissured longitudinally (a simple crack) at the place of contusion, and the crack extended into the marrow. There was also an old *extravasation of blood in the medullary tissue at the place of contusion*. It was dark-brown, or almost black in color, and occupied the whole thickness of the medullary canal through a space about one inch long; it appeared to date from the

contusion. Above this extravasated blood the *red inflammatory marrow of Virchow*¹ was seen.

The tibia was not injured; but the soft parts of the leg were a good deal swelled, and infiltrated with the products of inflammatory action.

The exact diagnosis in this case was not determined until, after death, an autopsy was made; but the existence of contusion of at least one of the bones of the leg was suspected during life, although an exploration of the wound with the finger always showed that the osseous tissue was not denuded of its periosteum, and that necrosis had not taken place. This suspicion grew out of the unsatisfactory progress of the case. The leg continued to be swelled and inflamed. The wound continued to discharge, and showed but little inclination to heal. The patient's strength slowly wasted away; and all this occurred without obvious cause. The wound of the soft parts was not complicated with fracture. The irritation in the surrounding tissues was not kept up by the presence of any foreign body. This had been demonstrated more than once by careful exploration with the finger. To what then could we attribute the adverse progress of the case? Having previously had some experience with contusion of bone, we were led to suspect that this patient was suffering from such a contusion, and from the morbid condition of the bone itself, and of the neighbouring soft parts, together with the system at large induced by it.

Here, then, was the gist of the matter. An inflammatory irritation² had been lighted up in the bone, the periosteum, and the marrow by the contusing force of the bullet, and by the presence of extravasated blood in the marrow. If such inflammatory irritation had not occurred, it is highly probable that the wound would have got well without any trouble, and if, at any time in the progress of the case, this irritation had ceased, the morbid condition of the soft parts would have soon disappeared. It is also highly probable that the bruised condition of the medullary tissue, and likewise the blood extravasated into its meshes, had a good deal to do with keeping up the inflammatory irritation, both local and general, and with continuing the exhausting drain upon the system occasioned by the supuration.

Thus, the contusion of even a slender bone like the fibula, with moderate extravasation of blood into its medullary tissue, trivial as this injury may appear to be when isolated, and considered apart from its legitimate relations, became the cause of this man's death; and that, too, without having induced necrosis, or suppurative osteitis, or even periostosis.

This fact brings us to the consideration of another important consequence, in a pathological point of view, which may be produced by contusion of bone, viz., *Osteo-Myelitis of a Simple Character*. *This constitutes the third, in our order of enumeration, of the legitimate consequences of*

¹ Vide Lectures on Cellular Pathology, p. 458.

² Vide Virchow's Lectures on Cellular Pathology, p. 429.

this kind of injury. The last case affords a very good illustration of the pathological condition of bone to which the term *simple osteo-myelitis* may be applied. But it will be recollected that, in that case, the contusion of the bone was accompanied by an extravasation of blood into the medullary tissue. A case of contusion of bone, in which inflammatory irritation in the osseous tissue has been kindled directly by the contusion, and without the intervention of ecchymosis, is more strictly typical, and will, therefore, more exactly illustrate this part of the subject. The next case affords such an example.

CASE IV. *Gunshot wound of left thigh, followed by typhoid symptoms; death on the forty-second day from exhaustion; contusion of the shaft of femur with consecutive osteo-myelitis discovered at the autopsy.*—Private John Anderson, Co. G, 76th N. Y. Vols., aged 30, born in Sweden, was admitted to Stanton General Hospital, June 12, 1864, for a gunshot wound of the left thigh in the upper third, inflicted in action at Cold Harbor, June 6th, by a conical musket-bullet, which penetrated the front of the limb at the inner side of the femoral vessels, and, passing backwards and outwards through the limb, lodged beneath the skin. It was extracted by an incision from behind. When he came to the hospital, six days after the injury, it was thought that the wound was only a flesh one. His general condition was fair, or rather below par, at that time. Simple dressings to wound were ordered, and nutrients and stimulants were allowed. Subsequently the wound did well, and he appeared in a fair way to recover for a time.

July 1. It was observed that he was failing in strength and emaciating. Stimulants and the supporting treatment were continued with tinct. ferri muriat.

Afterwards he sank into a typhoid condition, the skin becoming warmer than natural, but without sweats, the pulse frequent and feeble, the tongue dry and red, with almost entire loss of appetite. He also became somnolent, and towards the last it was difficult to rouse him. He did not have any chills. He died July 18th. The amount of discharge from the wound was at no time great, but the thigh remained swelled and inflamed all the while.

On making an *autopsy*, it was found that the bullet had struck the shaft of the femur on its postero-inner side, two or three inches below the trochanter, *grazing and bruising it.* The aperture of exit had healed. There was an abscess about the place of injury of the bone, as large as an orange, and pus had also burrowed among the muscles of the thigh. There was a large deposit of new bone about the contused portion of the femur. A longitudinal section was made with a saw. New osseous tissue was also found deposited in the medullary canal. The marrow presented the "red inflammatory" appearance described by Virchow.¹ There was no thrombosis, nor any lesion whatever of the veins and arteries. The cadaver was considerably emaciated, and resembled in its general appearance that produced by typhoid fever. There was no lesion of the intestines or any other of the internal organs. For an account of the autopsy and for much other interesting information concerning this case, the writer is indebted to Asst. Surg. George A. Mursick, U. S. Vols.

¹ *Vide Lectures on Cellular Pathology*, p. 458.

The inflammatory irritation of the periosteum of the bone itself, and of the marrow, which was developed in this case, appears to have been a direct result of the contact between the bone and the bullet in motion (bruise). The morbid product of this inflammatory irritation¹ consisted mainly of deposits of new osseous tissue, both upon the exterior, and within the medullary canal of the femur, in the neighbourhood of the injury. The development of this new bone was accompanied by abnormal vascularity (redness) of the marrow, of the old bone, and of the periosteum. The consequence to the patient of this protracted inflammatory irritation of bone was, that the neighboring soft parts were kept in a swollen and inflamed condition, that an abscess formed, that pus burrowed among the muscles of the thigh, that irritative fever was established, and that, finally, death took place from exhaustion. In all its main features, this case coincides with the last.

It has already been stated in substance that the last two cases afford examples of a kind of inflammatory irritation resulting from contusion, which affects the periosteum, the bone itself, and the marrow, in such a way as to produce increased vascularity, denoted by redness (hyperæmia) of all those parts, accompanied by a bright red flesh-like appearance of the marrow, and by the formation of new bone in the medullary canal as well as in the parts outside of the external compact layer. Although, in both instances, this inflammatory irritation (simple osteo-myelitis) destroyed life, it produced such a result, not by the destruction of the bone itself, but by the mischief which it excited and afterwards kept up in the neighbouring soft parts, and in the system at large. In reality, these two cases furnish examples of osteo-myelitis with a tendency to hypertrophy, or the formation of an increased quantity of homologous tissue at the seat of irritation, the inflammatory action² being analogous in character to that which is called adhesive in the soft parts.

But contusion may, and often does, excite a more profound inflammatory action in the injured bone than that from the consideration of which we have now passed, and this osseous inflammation may be so intense as even to destroy the vitality of the shaft of a long bone to a very great extent, and in the course of but a few days.

This statement brings us to the consideration of *the fourth important consequence of contusion of the bone, viz., Necrotic Osteitis, or an inflammation of bone so severe in character as to terminate in necrosis*. Without doubt the periosteum and the medullary tissue also are involved in the inflammatory process, but the destructive action appears to be confined to the osseous tissue, and therefore the phrase, osteitis terminating in necrosis, seems to be more appropriate than that of osteo-myelitis having such a result. The following case presents a good illustration of extensive necrotic osteitis produced by contusion :—

¹ Op. cit., pp. 429, 430.

² *Formative irritation*. Virchow's Lectures upon Cellular Pathology, p. 438.

CASE V. Contused wound of left tibia from a minie ball; severe constitutional disturbance, with chills, beginning on the twenty-first day; osteitis and extensive necrosis of shaft of tibia. Reported by Acting Asst. Surg. John B. Garland, U. S. Army.—Corp. Henry Rall, Co. D, 15th N. Y. Heavy Art., aged 22, and sound in constitution, was admitted to Stanton General Hospital, June 4, 1864. This man had been wounded near Old Church, Va., May 30th, by a minie ball, in the upper third of the left leg. The bullet passed across the tibia about four inches below the patella, bruising the bone, and slightly grooving its surface. He was somewhat debilitated, but, upon the whole, his general condition was not unfavourable. Ordered quietude, cold water dressing to wound, porter, and a nourishing diet. This method of treatment was continued for fifteen days. The suppuration was profuse, the limb a good deal swelled, and the wound did not incline to heal. The progress of the case was not considered unsatisfactory during this time, taking into account the presence of an osseous lesion.

June 18. He had febrile symptoms last evening.

19th. He had a chill this afternoon, and the wound looks inflamed. Prescribed quiniæ sulph. gr. vi, three times a day.

20th. He had another chill, and complains of much debility, with loss of appetite. The wound is more inflamed. Prescribed quiniæ sulph. gr. x, three times a day, ferri et potass. tart. gr. v, every four hours, and whiskey f3j, every three hours. Directed also the ice-dressing to be applied to the inflamed part, and morphia to be administered to secure freedom from pain.

25th. The chills have stopped, but the febrile movement continues, and the wound is sloughing. The whole leg is swelled and painful. Prescribed a solution of permanganate of potassa (one part to four) to be employed as a cleansing wash for the wound; tinct. ferri muriat. gtt. xx, ter in die, in place of the tartrate of iron and potassa, morphia at night; the quinia, stimulant, and ice-dressing are to be continued.

27th. The patient is free from fever, and has a fair appetite. The sloughing has stopped, but the leg is much inflamed, tender, and painful. Stimulants, tonics, and anodynes continued.

July 2. The leg is much swollen, and very painful, and exhibits deep-seated fluctuation. Opened it freely by an incision about five inches in length. A quantity of matter was discharged. The periosteum was found to be extensively separated from the tibia, and the bone itself appeared to be extensively necrosed. Ordered same plan of treatment to be continued, with pulv. opii gr. j every three hours.

10th. A second incision was made in the swollen leg, with a view to evacuate the pus more completely. Directed the quinine to be suspended, and the ice-dressing, stimulant, and opium, in the same doses, to be continued.

14th. The patient appears to be doing well. He has a good appetite, and appears to be more hopeful and cheerful.

23d. He is doing well.

30th. The wound does not run as freely as desirable. The granulations have assumed a less healthy look. They are flaccid and pale. Prescribed unguent. resinæ.

August 1. He had a chill last night, and is now (morning) bathed in cold perspiration. He has lost his appetite. Prescribed quiniæ sulph. gr. x, three times a day, tinct. ferri muriat. gtt. xx, three times a day,

alcoholic stimulants, and a flaxseed poultice to the leg, and he got better in a few days.

Sept 15. His general health is good. The leg now gives him but little trouble. There are several openings in the soft parts through which the tibia can be seen denuded of periosteum. The shaft of the tibia is extensively necrosed, and an involucrum developed from the periosteum is in process of formation.

Oct. 27. Examination with the probe shows that a large part of the shaft of the tibia is necrosed and loosened, but it is not yet sufficiently detached to justify removal by operation. The only treatment required during the past month has been poultices for leg, and a nourishing diet. His general condition is splendid. He has become quite fleshy. His appetite and spirits are excellent. At this time the writer relinquished the charge of the case, having been assigned to duty elsewhere, and therefore he is unable to continue the account of it.

He has, however, been informed by letter, under date of March 2, 1865, that the patient is still under treatment at Stanton Hospital.

In reflecting upon the clinical history of this case, it is interesting to notice that the osteitis which probably began on the 18th and 19th had terminated by destroying the vitality of a large part of the shaft of the bone-involved (tibia) before the 27th. It is also interesting to notice the vigorous effort which nature made on the 25th to secure a free opening through the soft parts down to the inflamed bone, by causing the wound to slough. Again, an abscess formed in the soft parts about the bone which was laid open July 2 by an incision about five inches long, and the periosteum was then found to be extensively separated from the tibia. It became necessary to incise the leg extensively again on the 10th. From both of these incisions the patient derived much relief and much real benefit. Would he not have been benefited still more, if the leg had been laid open down to the inflamed bone, by long incisions, several days prior to July 2? Did not the sloughing, which attacked the wound June 25th, denote the necessity that existed for the construction of a freer opening? These questions bring up the subject of the treatment of contusion of bone, but as it can be more conveniently considered in another part of this paper, all remarks upon it will be deferred to that place.

There is one point in connection with the pathology of acute inflammatory necrosis which, perhaps, should be here brought more distinctly before our minds. It was briefly alluded to while discussing the *modus operandi* of necrosis produced by traumatic ecchymosis. In such cases, blood is extravasated into the interspaces of the osseous tissue, in such a way as to arrest the circulation in the portion of bone involved, by compressing the capillary vessels against the unyielding calcified osteine, which enters very largely into the composition of all osseous formations. In such cases, the death of the osseous tissue is occasioned directly by the arrested nutrition. Now, in cases of necrosis produced by inflammation of bone, the same result is brought about in a similar way. The main difference between the

modus operandi of these two forms of necrosis is, that in one of them blood is extravasated into the osseous tissue, and in the other the *products of inflammatory action*¹ are exudated into that tissue. In the one case, the compressing agent is extravasated blood, in the other case, it is an exudation produced by the inflammatory process and poured out into the interspaces, more especially the canaliculi of the inflamed bone. It is, therefore, no longer a subject of wonderment that severe osteitis is very apt to produce necrosis.

Again, another, and in point of number the fifth, sad consequence of contusion of bone which has come under the writer's observation is *Suppurative Osteo-Myelitis*, or inflammation of both the osseous and the medullary tissue accompanied by the formation of pus in those tissues. The following case affords a good example of it:—

CASE VI. *Contusion of the shaft of the left femur by a grazing bullet; extravasation of blood into the medulla; extensive necrosis the sequel of suppurative osteo-myelitis; pus in the medullary canal; death on the fiftieth day.* Reported by Acting Asst. Surgeon Charles H. Osborne, U. S. Army.—Sergt. F. Waltz, Co. D, 8th Mich. Vols., aged 39, was admitted to Stanton General Hospital, July 4, 1864. He had been wounded in battle before Petersburg, Va., June 30th, by a minie ball, which, entering the outer side of the right thigh in the upper third, passed transversely through posterior to the bone; then, entering the left thigh, passed through it grazing the femur, and lodged beneath the skin, from whence it was extracted by a small incision. At the time of admission to hospital, both wounds were suppurating freely, and his general condition was poor. Full diet, tonics, and stimulants were ordered, with ice-dressings to the wounds. His bowels being constipated, sal Rochelle ʒj was administered. He complained of pain in the shoulders and upper extremities. His bowels remained obstinately constipated, and required occasionally laxative medicine until August 10th, when the opposite condition set in, and he had from three to four passages during the twenty-four hours, attended with rigors. Bismuth and opium were added to the treatment. The tongue became coated, he lost his appetite, and by August 14th all the symptoms commonly pertaining to typhoid disease were fully developed. The treatment now consisted of nutrients, stimulants, small doses of ol. terebinth. in emulsion, and quiniæ sulph. in solution. The discharge from the wounds became more profuse and thin. *He complained of great pain in the left thigh. Necrosed bone was detected by examination with the probe.* Opium was administered to allay the pain, and the diarrhœa was partially checked by injections of starch and opium. He gradually sank deeper into the typhoid condition, and died August 19th.

Autopsy twenty hours after death.—Cadaver extremely emaciated; muscles of left thigh infiltrated with pus; femur extensively denuded of its periosteum; necrosis of its shaft for two-thirds its length; a new bony deposit surrounds the femur at place of contusion; the lower three-fourths of the *medullary canal* contain a *thin, greenish-coloured pus*, which empties itself where the bone is denuded; the upper fourth contains *old clotted blood*. Pus to the amount of fʒj was found within the capsule of the hip-joint.

¹ Vide Barwell on the Joints.

The lungs and heart were normal; liver slightly enlarged; spleen enlarged and soft; kidneys normal; Peyer's glands presented the "shaved chin" appearance.

The bullet had grazed and bruised the femur a short distance below the trochanters.

The porosity of the necrosed bone was very much increased.¹ It presented a worm-eaten or honeycomb appearance, which was most marked in situations where the periosteum had become detached. There was pus in the pores or interspaces in such localities.

This case presents an instance of inflammation of the osseous and the medullary tissue, occasioned by a spent bullet, still more unmanageable and destructive than any of the preceding ones, but, in view of what has been already said, it does not seem to require any extended comments.

There is *still another, the sixth, sad consequence of contusion of bone*, which has been witnessed by the writer. It is *Gangrenous Osteo-Myelitis*, or a *septic inflammation* of the osseous and of the medullary tissue, resulting not only in the death of those tissues, but in their *putrefaction and rapid disintegration*. The next case gives a good illustration of it.

CASE VII. *Gunshot wound of left thigh, upper third, from a spent bullet; contusion of femur at root of trochanter major, with fissure of external compact osseous layer, but without indentation; gangrene of bone; pyæmia; death on the twenty-first day.* Reported by Acting Asst. Surg. John B. Garland, U. S. Army.—Corp. Thomas C. Cranston, Co. I, Sixth Michigan Cavalry, aged 25, was admitted to Stanton General Hospital, June 4, 1864. He had been wounded near Salem Church, Va., May 26, in the upper third of the left thigh, by a conical musket-bullet, which penetrated the limb obliquely from the front, and, passing backwards, upwards, and somewhat inwards, lodged deeply. He stated that the bullet was extracted on the field through the orifice of entrance. Prescribed water dressings, quietude, and nutrients, until he should recover from the fatigue occasioned by transportation.

June 5. The wound presents a very unhealthy appearance, and discharges a thin, dirty-coloured, extremely offensive fluid. He is feverish and restless, with considerable jactitation; tongue coated with white fur; bowels have been constipated for several days; he has also some difficulty in passing urine. Prescribed a wash of permanganate of potassa (3ij to Oj) for wound, bowels to be opened with ol. ricini, and directed him to take spt. nitre dulc. gtt. xxx in flaxseed-tea three times a day.

6th. He is no better; is still feverish, and looking badly; bowels have not acted. Ordered magnesia sulph. 3j.

7th. The Epsom salt has operated, and he appears to be somewhat better; passes his water better; but he is still depressed, and his appetite is poor. Prescribed quiniæ sulph. gr. vj three times a day.

9th. He had a chill last night; has vomited bilious matter; has fever, cough with rusty-coloured sputa, and hurried respiration; complains of pain in the side; complains also of great weakness; it is evident that pneumonia has supervened; it is also probable that the bone has been

¹ Osteo-porosis (inflammatory). Vide Virchow's Lectures on Cellular Pathology p. 465.

bruised by the spent bullet. Directed a large sinapism to be applied to the breast, six dry cups to the back, the quinia to be continued, sherry wine $\bar{3}j$ every two hours, with nutrients, and tepid sponging of the body under blankets.

11th. He is much worse; has pyæmic chills and sweats. Continue treatment, with the addition of whiskey $\bar{3}vij$ per day.

12th and 13th. The chills and sweats continued.

14th. He is lethargic, and evidently sinking.

15th. He died.

Autopsy twelve hours after death.—The bullet had penetrated the left thigh in the upper third, at the external border of the sartorius muscle, and passed backwards and upwards in such a manner as to hit the femur at the root of trochanter major, *bruising that bone, and cracking its external compact layer, but without indentation.* There were some small scales and particles of lead still adhering to the bone. *The whole of the superior femoral epiphysis was denuded of periosteum, and gangrenous, down to the commencement of the marrow. On section with a saw, the gangrenous osseous tissue presented a dirty dark-green or greenish-brown colour, and an offensive odour of putrefaction. There was an abscess in the marrow at the upper end of medullary canal.* The hip-joint was filled with unhealthy pus; no opening in capsular ligament.

The lungs were studded throughout with a large number of small whitish pustules, the so-called secondary abscesses, and the lower lobe of the right lung was hepatized (red). About three gills of lemon-coloured fluid were found in the pericardium. The heart was normal. Each kidney exhibited three or four small superficial abscesses looking not unlike pustules. The spleen was large, and exhibited also a few small superficial abscesses, with some induration of the tissue surrounding each of them. The liver and the other organs were normal.

The anatomico-pathological differences between the form of gangrene of bone presented by this case and ordinary necrosis are well marked. For example, a piece of necrosed bone is apt to be dry, white in colour, comparatively inodorous so far as the tissues entering its own composition are concerned, and it bears a strong resemblance to the ordinary bleached osseous tissue of the skeleton in appearance. But gangrenous bone, or rather the kind of it described above, is moist, dirty gray, dirty pale-green, or dirty greenish-brown in colour, and exhales to a greater or less extent the intolerably offensive odour of rotting bone. The writer has seen many other instances of this form of gangrene of bone connected with severe traumatic lesions of the osseous tissue, one of which, the case of Mackey, was reported in the last number of this journal (*vide American Journal of the Medical Sciences*, vol. xlix. p. 300, April, 1865). Some of them have occurred in connection with compound comminuted fracture of the femur, and others in the stump bones of amputated limbs. In the case of Mackey the compact tissue presented a white appearance, but the general features in all of them have been essentially the same, and of so marked a character as to make it not difficult to discriminate between the gangrenous bone and the morbid specimens of osseous tissue obtained from cases of ordinary necrosis.

It is worthy of remark that, in the case reported above, the gangrene of bone was accompanied by pyarthrosis of the hip-joint, and by pyæmia, with the so-called secondary abscesses peculiar to that disease. The same relation has obtained between gangrene of bone and pyæmia in other cases that have come under the writer's notice; but it has not done so in all of them, for in the case of Mackey the autopsy showed that there was neither thrombosis nor secondary abscesses in any part of the body, and the symptoms developed during life did not in any way favour the supposition that pyæmia had supervened.¹

ON NECROSIS PRODUCED DIRECTLY BY THE CONTUSION OF BONE, WITHOUT THE INTERVENTION OF EITHER ECCHYMOSIS OR INFLAMMATORY IRRITATION.—Up to this point in the discussion our attention has been mainly occupied with the consideration of traumatic ecchymosis of the osseous tissue, and with the study of certain inflammatory conditions of bone produced not unfrequently by contusions, such as inflammatory necrosis, simple osteo-myelitis, suppurative osteo-myelitis, and gangrenous osteo-myelitis. In all these various pathological conditions of the osseous tissue, induced by injury in the nature of a bruise, the death of the osseous tissue involved (necrosis) has not been occasioned directly by the contusing force itself, but indirectly by the intervention of some pathological process, such as the extravasation of blood, or the exudation of some of the products of inflammatory action, into the osseous tissue, etc. etc. We now proceed to the consideration of a form of necrosis which is occasioned directly by the mechanical commotion set up among the osseous particles themselves, by the sudden application of sufficient force in the nature of a bruise, without the intervention of any pathological process whatever. In all such cases the injured part of the bone loses its vitality at once, and becomes colourless and exsanguine. This is the form of contusion of bone inflicted by a spent ball which attracted Dr. Stromeyer's attention. He says: "The spot struck by the ball is colourless and exsanguine; in its circumference appears the commencement of a line of demarcation." In all such cases a circumscribed portion of the osseous tissue is killed outright, and nature immediately commences preparations for its separation and removal from the living bone surrounding it. This form of osseous contusion may be produced by the kicks of animals, by blows, and by falls, as well as by spent bullets. The following case is an example of this kind of injury produced by a glancing bullet:—

CASE VIII. *Gunshot wound of scalp and contusion of cranium inflicted by a glancing bullet; necrosis and exfoliation of the bruised*

¹ This is not intended as a complete discussion of the subject of osteo-myelitis. The writer here speaks of that disease mainly as he has seen it in connection with one class of gunshot injuries, viz., contusion and contused wounds of bone.

osseous tissue; recovery. Reported by Acting Asst. Surg. W. B. Dick, U. S. Army.—Private Henry Abbott, Co. B, 32d Mass. Vols., was admitted to Stanton General Hospital, June 4, 1864, for a wound of the head inflicted a few days before by a glancing bullet. It struck him over the right parietal bone, thence passed forwards and downwards, exposing the temporal suture, and escaped, having made a wound of the scalp about three inches in length, and exposing the cranium. *The bone was not fractured.* The patient's general condition was excellent. He did not exhibit any cerebral symptoms worth mentioning. His bowels were soluble. Treatment: quietude, ice-dressing to head, tinct. rad. aconiti gtt. ij every three hours, and a spare diet.

June 7. He has diarrhœa, with six or eight evacuations in twenty-four hours. Prescribed opium gr. $\frac{1}{2}$; acid. tannic. gr. j; pulv. camphor. gr. ij; to be administered after each passage. The diarrhœa ceased in a short time, and his general health continued good.

July 12. Removed a piece of necrosed bone about an inch in length by half an inch in breadth. It included a portion of the temporal suture, and was composed of the outer table and the diploe. The wound is filled with healthy granulations. The patient has good health. Prescribed the water-dressing in place of ice.

14th. Removed another piece of necrosed bone about half an inch in length, and corresponding to that already mentioned. It consisted of the internal table.

17th. Health very good; wound almost healed.

18th. Left the hospital, having been transferred to the North.

In this case a projectile fired from small-arms struck the cranium in such a way as to destroy the vitality of both tables over a considerable space, without producing fracture, or any solution of continuity whatever perceptible to the unaided vision. In the course of about six weeks the dead bone became detached, and was then extracted. In a few days longer the wound healed up. All of this took place without the occurrence of inflammation of the bone or of the adjacent soft parts, or even the exhibition of any cerebral symptoms worth mentioning. This circumscribed necrosis, involving both tables of the skull, could not have been produced by osseous inflammation, because that morbid process was not present at any time during the progress of the case; it could not have been produced by extravasation of blood into the pores and interspaces of the bruised bone, because the tissue of the necrosed fragments was clean, white, and not stained with blood, as it would have been under such circumstances; the conclusion is therefore irresistible that in this case a portion of living bone was killed outright by the stroke of the glancing projectile. By it a violent commotion was produced among the osseous particles, which must have proved highly detrimental to the integrity of the bone cells. Now, when we reflect upon the important office in the economy of the osseous tissue performed by the branched cells discovered by Virchow; that all the natural processes of the growth and decay, of the waste and repair of that tissue, are effected through the agency of these bone cells; that the office discharged by the bloodvessels of bone is, in reality, secondary to that fulfilled

by the cells, for the vessels must be considered as the pipes through which nutritive and other material is brought into the interior of the osseous tissue, where it undergoes a variety of transformations through the instrumentality of the bone cells; bearing this in mind, it is easy to conceive that any agency which would greatly disturb the integrity and the relations of the bone cells would also destroy the vitality of the bone itself. Barwell says: "Bone consists of a number of branched cells, whose interstices (intercellular spaces) are occupied by a compound of cartilage and phosphate of lime, and among which vessels pass in a certain definite relation. By adopting this method of description, the different elements of which bone is composed are reduced to their proper relation—first the cells, then the cellular substance, and then the vascular supply." (*Barwell on the Joints*, p. 19, American edition.) The bone cells are, without doubt, the most important histological element which enters into the composition of bone. In the variety of osseous contusion now under consideration, may it not be true that the necrosis is due to the rupture of some of the bone cells, and the disturbance of the relations between others of them, occasioned by the commotion among the particles of the osseous tissue produced by the contusing force? The writer begs leave to commend this subject to the attention of all investigators in the domain of osseous pathology.

The separation of the dead from the living bone in this class of cases is accompanied with the following phenomena: From the living osseous tissue, where it borders on to the dead, the calcareous matter is gradually withdrawn by absorption under the local excitement produced by the dead bone acting as an irritant, and, at the same time, the bone cells and the connective tissue throughout the same locality assume the appearance of fleshy red granulations.¹ In this way the dead becomes separated from the living osseous tissue by a layer of florid soft granulations *formed at the expense of the living tissue*, which accounts for the fact that in the dried specimens of circumscribed necrosis the cavity is frequently found to be larger than the piece of dead bone which came out of it. This disparity in size is not due to a solution of the exterior of the necrosed fragment in the puriform fluid with which it is bathed, but to the beautiful process of conservation noticed above.

The case last narrated marched on to recovery without the occurrence of any untoward symptoms. The necrosed bone exfoliated, and was removed without any difficulty whatever. But we do not always have the same good fortune in the management of similar cases. That they do not always present the same freedom from suffering and danger will be perceived on the perusal of some of the following cases. While the process of exfolia-

¹ *Vide* Virchow's Lectures on Cellular Pathology, pp. 462-465. He says: "Granulations are nothing more than a young, soft, mucous tissue, analogous to marrow."

tion is taking place, an inflamed condition of the contiguous soft parts, attended with the formation of pus, is exceedingly apt to be present, and to inflict much suffering upon the patient. In occasional instances an inflammatory action is kindled in the surrounding osseous tissue, so severe in character as to terminate in inflammatory necrosis of a large part of the bone which had not suffered from the original injury; and in still rarer instances a suppurative inflammation is lighted up in the cancellous structure, or in the marrow, which may terminate in death by pyæmia before the process of exfoliation has been completed.

The following case will serve to illustrate the troublesome character of the sympathetic inflammation of the soft parts which is not unfrequently excited during the exfoliation of osseous tissue that has been deprived of its vitality by the stroke of a musket-ball:—

CASE IX. *Contusion of external malleolus of left ankle from fire-arms; exfoliation of the bruised osseous tissue; recovery.* Reported by John Moore, Med. Cadet U. S. Army.—Priv. Pat. McCabe, Co. "G," 87th Penn. Vols., aged 23, was admitted to Stanton General Hospital, July 4, 1864, having been struck by a musket-ball in front of Petersburg, Va., June 23d, which inflicted a flesh wound of the left ankle, about two inches in length, and in relation with the external malleolus. The bone proved to be contused, but its surface was not grooved, indented, fissured, or discoloured.

At the time of admission to hospital the limb was greatly swelled up to the knee, and the pain, throbbing in character, was very intense. The patient exhibited a good deal of constitutional disturbance, adynamic in character. The ice-dressing was applied to the inflamed parts, and stimulants and tonics (porter and iron) were given internally.

July 5. A flaxseed poultice was applied to the ankle, but it afforded no relief whatever. The swelling and pain continued unabated.

10th. An abscess having formed on the dorsum of the foot, it was evacuated by making a free incision, but the patient still continued to suffer a great deal of pain, and the swelling did not subside.

August 1. A thin narrow piece of bone about an inch in length exfoliated from the external malleolus, and was taken out of the wound. Subsequently another small piece of necrosed bone was removed. After the last piece of bone came away the patient began to improve rapidly. By the forepart of September the swelling had almost entirely disappeared, leaving only a moderate amount of thickening of the ankle. The pain had entirely disappeared.

Sept. 12. The patient is improving rapidly under potass. iodid. The thickening of the ankle has almost gone, and the wound is nearly healed. There is but little motion at the ankle-joint. He is in good condition and in fine spirits, although still confined to bed.

20th. He continues to improve rapidly, and leaves the bed daily to sit up in a chair.

25th. He begins to walk with crutches.

Oct. 3. He left the hospital on furlough for sixty days.

It is an interesting fact that in this case, as in the last, it required about six weeks to complete the process of exfoliation, and that, although the

injury was sustained in close proximity to one of the largest of the articulations, he made a good recovery with what it was thought would prove to be a useful limb in the end. The process of separating the dead from the living osseous tissue (exfoliation) in this case was accompanied by much inflammatory excitement in the adjacent parts, and by the formation of an abscess on the dorsum of the foot which required to be treated by free incisions. This inflamed condition of the ankle was attended with a good deal of pain, because both the joint cavity and the dense periarticular tissues were involved in the swelling. This inflammatory mischief was kept up by the irritation occasioned by the presence of dead bone in the midst of sensitive living tissues. It was highly interesting to notice the rapidity with which the patient improved so soon as all the necrosed bone had come away. The pain ceased at once, the constitutional disturbance disappeared, and the swelling subsided in a short time.

Another interesting fact pertaining to this case is that the joint inflammation, although it lasted for so long a time, was not destructive in its character. It was not accompanied by the formation of pus in the interior of the articulation, and when the case was last examined by the writer there was still a small amount of mobility at the joint, but it probably terminated in complete ankylosis.

CASE X. Gunshot wound of right hip; contusion of ilium; bullet lodged, and was extracted primarily through orifice of entrance; subsequently much constitutional disturbance, and much inflammatory mischief in soft parts; exfoliation of necrosed bone; convalescent. Reported by Act. Asst. Surgeon G. W. Baker, U. S. Army.—Private Michael Mack, Co. "K," 96th Penn. Vols. was admitted to Stanton General Hospital, June 4, 1864, for a gunshot wound of the right hip. He was but seventeen years old, and stated that the wound had been inflicted in action near Mechanicsville, May 28th, by a minie ball. It penetrated the lateral surface of the right pelvic region about two inches below the crest of the ilium, and about the same distance behind the anterior superior spinous process of that bone. He also stated that the bullet lodged and was extracted the next day, through the orifice of entrance, while he was under an anæsthetic.

When he came to the hospital, exploration of the wound with the finger showed that the bullet had struck the bone, which was bare, but not fractured. He was able to get around on crutches, and the wound presented a healthy appearance, although the contiguous soft parts were a good deal swelled and inflamed. Prescribed the ice-dressing, and suitable alimentation.

Subsequently the discharge from the wound became very profuse. The swelling did not abate, but rather increased, and became indurated in feel. The wound did not heal up. After a time he had a great deal of pain in the wounded hip. It was also noticed that he was losing colour, flesh, and strength, and he became confined to his bed. It became obvious that he was steadily getting worse. Treatment, ice-dressing, tonics, nutrients, stimulants, and anodynes, *pro re nata*.

About the 20th of August the patient's appetite failed. His tongue also became coated, and he had considerable fever, with headache, and a

frequent, quick, irritable pulse. He was very pale, and seemed to be failing rapidly. His bowels were regular. He complained much of pain in the wounded parts. Stimulants and anodynes were freely administered. The headache lasted only two or three days, and the febrile symptoms gradually became less intense, but the swelling of the wounded hip increased.

Sept. 9. An abscess of considerable size has appeared midway between the crest of the ilium, and the linea alba, and a little above the groins. He is pale, thin, weak, and exhibits a good deal of constitutional disturbance (irritative fever). Incised the abscess and ordered poultices to be applied.

18th. Several small pieces of exfoliated bone came away from the gunshot wound. This was followed by rapid improvement in every respect.

27th. Patient's general condition comfortable and favourable. The incised wound or opening in the abscess is nearly healed, but the bullet wound is still open.

Oct. 14. The parts contiguous to the bullet wound have again become swelled, inflamed, and very painful. An abscess is evidently forming near the bone. Incised it freely and evacuated a quantity of matter, which afforded great relief.

28th. The difficulty in the gluteal region has pretty much subsided. The discharge of pus is but moderate, and the amount of swelling but slight. The patient's general condition is excellent. The lips of the bullet wound pout as they would do if some flakes of exfoliated bone still lay behind.

CASE XI. *Gunshot wound, contusing the left tibia near knee-joint, inflicted by a glancing bullet; recovery.*—Corp. James Chaffee, Co. "I," 6th Ohio Cavalry, 20 years old, always healthy, was admitted to Stanton General Hospital, Oct. 17, 1863, from the field. He stated that he had been wounded three days before, Oct. 14, by a conical musket-ball, while engaged with infantry, near Bristow Station, Va. The bullet impinged obliquely upon antero-outer part of the head of the tibia (left) about two inches below the articular surface, and glanced off, without penetrating or fracturing the bone. The course of the bullet was from behind forward, and from without inward. Directed the water-dressing to be applied, and allowed a full diet.

Subsequently the wound granulated, but slowly. He had a good deal of pain in and about it. No pieces of bone were discharged, and the knee-joint did not become involved.

Dec. 10th. The wound was nearly healed, and he left the hospital on a furlough for thirty days.

Jan. 1, 1864 (about). An abscess formed in the popliteal space, and two days afterwards the wound reopened spontaneously.

April 1st. The wound is nearly filled up, but it presents a smooth, glazed, and indolent appearance. Its edges are blue and indurated. It is now circular in shape, and somewhat larger than a dime. Subsequently it healed slowly, and, April 24th, he was sent to his regiment for duty.

This case is introduced for the purpose of showing that even the lighter forms of contusion of bone may exert an unfavourable influence upon the curative process in the injured soft parts, causing the wound to be slow to heal, and liable to break out again with slight provocation, or even without any provocation at all. In this case the character of the injury, so far as the bone was concerned, was so slight that no exfoliation took place. There

was at no time much inflammatory trouble in the soft parts, and no evidence whatever that the osseous tissue was suffering from inflammatory irritation. There was, however, in all probability, some inflammatory irritation in the periosteum at the place of contusion; and this served to keep up an unhealthy condition of the neighbouring soft tissues.

Treatment of Contusion of Bone.—It is obvious that any plan of treatment, in order to be satisfactory, should be adapted to the pathological condition which it is intended to modify or remove. This proposition holds true with the morbid states of the osseous system, as well as with those pertaining to the other tissues of the body.

Now, it has been shown in the foregoing pages, that contusion may produce the following pathological conditions of bone: First, necrosis from interstitial hemorrhage (ecchymosis). Second, an inflamed condition of the bone, marrow, and periosteum, formative in character, and accompanied by new osseous growths, together with much inflammatory mischief in the surrounding soft parts. Third, inflammation of the bone (osteitis) more severe in character than the last mentioned, and terminating in necrosis (inflammatory necrosis). Fourth, suppurative osteo-myelitis. Fifth, gangrenous osteo-myelitis; and Sixth, exfoliation of bone, the vitality of which has been destroyed primarily by the stroke of the contusing force. It may be advantageous to consider briefly the leading points in the treatment of each of these morbid states of the osseous tissue.

Necrosis from interstitial hemorrhage (ecchymosis) may occur in any of the bones which have a cancellous structure, but it is most frequently met with in the spongy epiphyses of the long bones. These cases are always likely to prove to be very serious on account of the inflammation, which sooner or later must be kindled in the surrounding parts by the dead bone. But, if the injury chances to be inflicted upon the epiphysis of a long bone close to one of the great articulations, such as the knee-joint, the gravity of the case will be very much increased. In such a case there will be no hope of recovery without amputation. Kimm's life was saved by a timely resort to that operation (*vide* Case I.), and Pryor died, that operation having not been performed (*vide* Case II.). In other cases it may be advisable to attempt to moderate the local inflammation, by quietude, by the local abstraction of blood, by the employment of the ice-dressing in the first stage, and by the use of fomentations in the second stage, and above all by the *early employment of free incisions*, so as to prevent the burrowing of matter among the muscles and in relation with the bone as much as possible. By pursuing this course the dead bone can be extracted at the earliest day practicable, and the neighbouring parts will have sustained the least possible amount of injury.

The treatment of the simple form of osteo-myelitis, or that inflamed condition of the bone, marrow, and periosteum, non-suppurative in cha-

racter, and accompanied by the formation of a new bone, together with much inflammatory mischief in the surrounding soft parts, is attended by a serious difficulty, which arises from the fact that the pathological condition of the osseous tissue is apt to be entirely overlooked, as it was in the cases of Sted and Anderson (*vide* Cases III. and IV.), because it is masked by inflammatory mischief in the soft parts. Now, such inflammatory mischief in the soft parts is kept up through the agency of the osseous lesion. In the meantime the case may go on from bad to worse, and the surgeon wonders why it does so until he discovers the real difficulty, which lays behind the inflammation of the soft parts, and is located in the osseous tissue. Besides the local abstraction of blood, and the application of ice-dressings or fomentations and poultices, according as the one or the other of these topical applications shall afford the most relief to the patient; free incisions should be made into the inflamed parts as soon as any pus has been formed, with a view to secure its early evacuation, and to prevent any burrowing among the muscles and the deep-seated tissues. Anodynes should be administered to secure immunity from pain, and the patient's strength should be supported, especially in the advanced stages of the difficulty, by the judicious use of nutrients, tonics, and stimulants.

The treatment of acute osteitis (inflammatory necrosis), when it supervenes upon contusion of the osseous tissue, should be conducted upon the same general principles as those which pertain to the form of osseous inflammation considered above. Blood should be abstracted topically by leeches or cups, and ice-dressings, or hot fomentations and poultices, should be applied, consulting the feelings of the patient, and employing the one which affords most relief. It is a good plan to try the ice-dressing first, and then, if the result is not satisfactory, to exchange it for fomentations or poultices, and *vice versa*. In this class of cases long and deep incisions are generally demanded at an early day. The good effect of such incisions is illustrated by the case of Corporal Rall (*vide* Case V.). The liberal administration of anodynes will probably be demanded, and when the patient's strength begins to flag, it should be sustained by nutrients, tonics, and stimulants, *pro re nata*.

With regard to the suppurative and gangrenous varieties of osteomyelitis, the treatment must be guided by the general principles indicated above. Cases VI. and VII. afford melancholy examples of the inadequacy of all treatment for the cure of the worst forms. But even in them something may be done for the alleviation of suffering and for the prolongation of life. The prophylactic treatment, especially in hospital practice, is a matter of the first importance. To avoid the overcrowding of the patients, to secure an abundant supply of pure air for their use, to cause them to be kept as clean and comfortable as possible should be the special duty of the surgeon, for, by so doing, he will materially diminish the opportunities for suppurative and gangrenous osteo-myelitis to occur.

The next case is introduced for the purpose of illustrating the great value of free incisions in treating contusions and contused wounds of bone.

CASE XII. Gunshot wound of the right hip; upper part of the femur furrowed and bruised by the bullet, which lodged in the thigh; violent inflammatory reaction in the soft parts, with protracted suppuration; recovery. Reported by Frederick Rorboak, Medical Cadet, U. S. Army.—Private Charles Wheeler, Co. F, 4th Mich. Vols., aged 19, was wounded at Spottsylvania C. H., May 10th, 1864, by a musket-ball, which penetrated the right hip and lodged deeply in the thigh. He was admitted to Stanton General Hospital May 13th for treatment. The wound was inflamed, and the thigh was swelled, hot, and tender. Exploration of the wound showed that the bone was injured, but the bullet was not discovered. The ice-dressing was applied to the inflamed parts. The swelling of the thigh, however, did not abate, and the wound suppurred freely. During the latter part of May the patient's condition grew worse instead of better.

May 31. The injured limb is much swelled and inflamed. The wound discharges a thin, dirty-looking, stinking pus. It was judged to be expedient to explore the thigh in a more thorough manner than on previous occasions, with a view to ascertain the precise character of the bone-injury, and to extract the bullet if possible. Accordingly, an incision four inches in length was made on the outside of the thigh, from the great trochanter downwards, and penetrating to the bone. This enabled us to find that the bullet, which, having entered the hip two inches above and behind the trochanter major, had passed downwards, forwards, and inwards to a great distance in the soft tissues of the thigh, had also torn a groove on the surface of the great trochanter and the upper part of the femur, and bruised the osseous tissue. A careful and thorough search for the bullet was instituted; both the fingers and the porcelain-tipped probe of Nélaton were employed, but without success. The patient was labouring under an attack of rubeola when this operation was performed. Prescribed the water-dressing for the wounds, quietude in bed, with nutrients, tonics, and stimulants internally.

The character of the discharge from the wound was speedily improved, and the inflammatory action in the soft parts began to abate. Afterwards several small pieces of bone separated and came away from time to time. They were as thin as the finger-nail, and varied in breadth from an eighth to a quarter of an inch. Towards the end of August he began to leave his bed and to walk about on crutches.

Sept. 13. His general condition is good, his appetite and spirits excellent. Both the bullet-hole and the wound of operation are almost healed up, and present a healthy appearance. The amount of discharge is small and laudable in character. He can bear his weight upon the injured limb, by pressing upon that knee with both hands, so as to prevent it from gliding forward through debility on the part of the extensor muscles of the leg.

The writer fully believes that this man would have gradually wasted away, and died worn out by the protracted suppuration and by the irritation of the system at large set up by the morbid condition of the bone and the neighbouring soft parts, an unfortunate result which befell several of our cases, if he had not been treated by free incisions. Indeed, as it was,

he got very much reduced at one time, and there even came to be much doubt as to his recovery. It is also probable that if the treatment by incision had been commenced at an earlier day, the patient would have been rescued from much suffering and peril, for, by this practice, judiciously employed, the extension of the suppurative process among the deep tissues of the thigh could, in a great measure, have been prevented.

With regard to the treatment which may be required by the exfoliation of osseous tissue whose vitality has been destroyed by the direct action of the contusing force, the first indication is to moderate, and keep under control the inflammatory excitement in the adjacent or contiguous tissues, whether osseous or soft, which the dead bone, acting as an irritant, will be likely to kindle. For such a purpose quietude, together with the ice-dressing and a spare diet, will generally suffice in the light cases, but the severe ones will demand also the abstraction of blood by leeches or cups, and the internal use of the cooling saline draughts, with opium in some form to allay pain. If any matter forms, it should be evacuated without delay. When the dead bone becomes detached it should, as a general rule, be extracted as soon as possible. Concerning the treatment of this form of exfoliating bone, reference may be advantageously made to Cases VIII., IX., and X. This form of necrosis becomes most dangerous to life when it rouses *a suppurative inflammation of the osseous or of the medullary tissue*. Illustrations of the fatal character of such osseous inflammation are not unfrequently furnished by the occurrence of suppurative inflammation of the diploë and consecutive thrombosis of some of the sinuses of the brain, while a contused patch of the cranium is being exfoliated. To prevent such unfortunate results, the prophylactic treatment of this class of cases becomes a matter of the first importance. These patients should not be crowded together, nor placed in a contaminated atmosphere. They should be provided with spacious and well-ventilated quarters. They should also be kept as clean, quiet, and comfortable as possible. By doing this, the surgeon accomplishes a great deal for the prevention of the destructive forms of osseous inflammation which sometimes follow contusion.

The following is, in some respects, a very instructive case:—

CASE XIII. *Contusion of the right tibia near its upper extremity, from the kick of a horse; exfoliation of necrosed bone; recovery.* Reported by Acting Asst. Surg. Charles H. Osborne, U. S. Army.—Corp. James H. Stewart, Co. H, 1st Vermont Cav., aged 22, was admitted to Stanton General Hospital, August 15, 1864, for an injury inflicted by the kick of a horse, which had bruised the right leg a short distance below the tubercle of the tibia, and produced a small abrasion of the cuticle. This was scabbed over, but it was also surrounded by a bright-red areola of inflammation about an inch in width, measuring from its inner to its outer margin. His general condition was poor, and he showed the usual symptoms of malarial poisoning. He did not complain of any pain other than a moderate amount of soreness. The water-dressing was applied, and full diet with stimulants allowed.

By the third day after he came to hospital the scab was removed, and a small ulcer with raised edges and pale granulations was exposed to view. Argenti nitras was applied, and the dressing was changed to unguent. resinæ. Tinct. ferri sesquichlorid. was added to the internal treatment.

The ulcer remained in the condition above mentioned, showing no tendency to heal until Sept. 1st. At this date he took a chill, his tongue became coated in the centre, and red and cracked at the tip and edges. Fever of a low type followed. His bowels inclined to be constipated, and were relieved by laxatives. The swelling of the leg increased, the ulcer assumed a phagedenic character, extending rapidly and discharging a thin pus. Nitric acid was applied to it, quinia, iron, opium, gr. j, every four hours, and stimulants were administered internally. From this time the fever gradually abated. After a time the slough separated and healthy granulations appeared. *A small flake or lamina of bone, about the size of the little finger-nail exfoliated and was removed.*

Oct. 12th. General condition much improved; appetite and spirits good; the ulcer is about an inch in diameter, healthy in appearance, and secretes a laudable pus. It is granulating rapidly and beginning to cicatrize.

18th. He is almost well; and able to undertake a journey of several hundred miles. He was transferred to General Hospital in his own State to-day.

This man's attending surgeon, Dr. Osborne, was not fully satisfied that the case belonged to the same category as osseous contusion, until the exfoliation of bone took place.

It is probable that the sloughing was principally due to an effort on the part of nature to secure a free aperture of communication with the bruised periosteum and bone, at an early day. Would not this patient have been benefited by a free incision down to the injured bone, made with the knife, when the bruise commenced to slough, or even prior to that time? Ought not the surgeon to take his cue from nature in such cases, at least so far as this point in the treatment is concerned?

An analysis of our cases yields the following results with respect to their causation, viz., in six of them the injury of the osseous tissue was produced by spent bullets, and in each of these six cases the bullet either lodged or was accidentally withdrawn through the orifice of entrance; five cases were hurt by glancing bullets; one was injured by a grazing bullet; and one by the kick of a horse. It is fair to suppose, also, that in at least some of the six cases wounded by glancing and grazing bullets, the projectile was not moving at anything like its maximum rate of speed. Now, this coincidence between the occurrence of contusion of bone and a greatly diminished velocity on the part of the projectile inflicting it, is certainly remarkable. It is also a fact of practical value to the military surgeon. It will lead him to anticipate serious consequences in all cases where a spent bullet has struck a bone, and to make timely preparations to meet them.

With regard to the influence of the state of the constitution upon the results of contusion of bone, it should be stated that all of our cases occurred in the persons of soldiers in the prime of manhood, and free from

constitutional taint in any form, that none of them were old or otherwise broken down, and that but three of them were at all debilitated at the time of injury.

With regard to the results, it should be stated that of the thirteen cases (this enumeration of course embraces the one kicked by a horse), one suffered amputation of the thigh, five died, and seven made more or less complete recoveries. This certainly exhibits a high rate of mortality, and serves well to illustrate the serious character of the lesion.

It has been stated incidentally that the pathological conditions of the bone produced by contusion are apt to be masked by the swollen and inflamed state of the overlying soft parts, so that the osseous lesion may escape notice for some time. This happened in no less than three of our cases, and it should serve as a warning to all surgeons to be vigilant while treating this class of cases.

The facts and observations set forth in the preceding pages have shown at least some of the serious consequences which are produced by contusion of bone. It could scarcely be expected that all of them would be successfully pointed out by any one surgeon, however extensive his experience in osseous pathology may be. But enough has been shown at least to indicate that any injury of bone in the nature of a bruise, however trivial it may appear to be at the time of infliction, may be followed by serious consequences, which it is the duty of the surgeon to anticipate and ward off if possible.

HEAD-QUARTERS ARMY OF THE POTOMAC, March 22d, 1865.

ART. II.—*Diphtheria, as it prevailed in Accomac County, Va., and its most Successful Mode of Treatment.* By EDWIN W. LE CATO, M. D.

EARLY in the autumn of 1863 the lower portion of Accomac County, Va., was visited by an epidemic entirely unlike anything that had previously prevailed, and consequently most of us were wholly unprepared to decide upon its character or how to treat it. In the beginning, a few of the profession believed it to be tonsillitis, others, putrid sore throat, ulcerated sore throat, &c. ; and not a few cases occurred before the true character of the disease was fully understood. But the great fatality of the malady soon convinced those who were in doubt, that the disorder was widely different from the anginose affections prevalent in this part of the world. It is now admitted by all to be what it really is—diphtheria.

The popular belief that the disorder was eminently contagious caused for a while much consternation in the community, greatly abridging social

intercourse where the disease happened to be prevailing. In some cases the fear of it was so great that the friends were compelled to perform the last sad rite of interment.

Not having any statistics of the actual number of deaths caused by diphtheria since its advent among us, it is impossible to give the exact mortality it occasioned, but certainly not less than two hundred persons, mostly children, have perished by the disease.

The district of country over which the disease extended does not exceed an area of fifteen or twenty miles square; and within this small compass it has continued its ravages without any seeming disposition to overleap the boundaries. Its limitation to this area is certainly not because the hygienic conditions of the adjoining country are better, or due to atmospheric influences. Neither can the disorder be satisfactorily referred to any known local causes, such as occupation, habits, &c., for throughout the peninsula they are similar. It is true that in the most sickly localities, that is, in the necks of land formed by the numerous small streams which extend for two or three miles up in the interior, diphtheria has been most prevalent and fatal; but why the materies morbi, whatever it may be, should exist in one neck and not in another separated only by a small stream not exceeding more than one-fourth of a mile in breadth, is a question which in the present state of our knowledge no one can answer. The disease has been supposed to originate in noxious emanations from the decomposition of animal and vegetable matter, uncleanness, want of proper aeration of the blood, and various other causes. No doubt these predispose and render persons and communities more liable when the disorder is already prevailing, as will any agent which can depress the vital forces of the system; but it cannot be consistently referred to such causes, I think, because they have existed from time immemorial, and formerly to a greater extent than at present, and yet have never before produced diphtheria.

Diphtheria is evidently a blood disease, the result of a deadly poison circulating in the blood, and consequently affecting the whole body, but expending its greatest power on the nervous system. The disease, however, has been regarded "not as a disease *sui generis*, but rather as many diseases alike only in being associated with the common characteristic formation." This view, I think, is rather untenable, for we are constantly meeting intercurrent affections in almost every disease. In enteric fever we encounter pneumonia and bronchitis; in variola and rubeola we have the same complications, and, in other cases, various admixture of diseases. I hardly think we would be justified in supposing these disorders to have no claim to distinction or separate consideration, because they are so frequently associated with each other.

Diphtheria is more likely to affect persons whose powers of resistance are naturally weak, or have become so by previous disease or debilitating influences; hence, perhaps, the greater liability of children and females.

And this may also in some degree account for its frequent attacks in the course of other disorders. But by far the largest number of cases as it prevails here are peculiar, and present the same uniform symptoms, which are sufficient to entitle it to consideration as an idiopathic affection. The odour which generally accompanies it; the small, frequent, thrilling pulse; the marked debility that quickly follows the attack, and the suddenness of all these symptoms, will oftentimes enable us, unless the case is very mild, to diagnose diphtheria before looking at the throat.

The disease, as it occurred here, presented two forms, both having the same origin, but differing in degree or intensity. For the sake of convenience, I may be permitted to designate them spurious or false diphtheria, and true diphtheria. In spurious diphtheria, the constitutional symptoms are generally slight—some acceleration and feebleness of the pulse, general malaise, slight muscular pains, some enlargement and moderate tenderness of the glands about the throat, and inflammation of the fauces were the most prominent symptoms. The tonsils were sometimes swollen, sometimes, on the contrary, their size was normal, but they generally present a dark red color. The uvula is very generally elongated, often clubbed, and œdematous. The digestive organs were not materially disturbed, though much less was taken into the stomach, owing to the pain induced by attempts to swallow even liquids. There is no exudation to be seen anywhere in the throat, and this is the distinguishing feature between the true and false. This form of the disease attacks adults principally, and is never fatal. It seems to be the result of an abortive action of the poison, the consequence of partial dilution, or the energetic resistance of the vital powers to its operation. The only thing peculiar about these cases was their obstinacy. They would run on for two or three weeks and longer without much change, under the ordinary remedies for angina; but, on the other hand, were speedily arrested when treated as diphtheria. These cases prevailing, as they do, at the same time and in the same family, and cured by similar treatment as true diphtheria, are doubtless caused by some modification of the same toxic agent. There is, however, no positive proof that this is so, and such an opinion can only be sustained by concomitant circumstances.

In true diphtheria the case is different. Here the attack almost invariably commences with a chill of considerable severity; sometimes, however, chilliness and heat alternate until fever is fully formed. The tongue is early covered with a white or yellowish-white fur, through which the enlarged papillæ can be seen giving it a somewhat peculiar appearance. The bowels were sometimes constipated, but usually there is a strong tendency to looseness, and cathartics were seldom needed after the beginning. The pulse was generally small, vibrating, and compressible, and ranged from 90 to 120 or 30. The throat was the principal source of complaint, and the pain in it was greatly increased by speaking or during the act of degluti-

tion. The submaxillary, parotid, and cervical glands in bad cases were very much enlarged and extremely tender to the touch. Debility was a marked feature in the disease, and the patient early experienced difficulty in locomotion. The countenance presented a rather sunken aspect, and the colour of the skin was of a slight dingy yellowish hue, which seemed characteristic. There were many mild cases, however, in which these symptoms are not so strongly marked. If the throat was at this time examined, large ashy deposits of false membrane could be seen on one or both tonsils, uvula, or velum palati, and, sometimes, covering the whole faucial region.

Earlier in the attack the exudation was more limited and was confined to a single small spot; but it spread with the greatest rapidity unless checked by appropriate remedies. The uvula was elongated, and very frequently completely covered by the exudation. In one case it extended so far down the pharynx that it gave the patient, an adult negress, the greatest amount of uneasiness by constantly exciting the muscles of deglutition. The exudation was generally confined to the throat, but sometimes extended to the Schneiderian membrane, and blocked up entirely the nasal passages. Not unfrequently it extended forward, and was deposited on the outer edge and under surface of the tongue. Occasionally, but much less frequently, it invaded the larynx and trachea, and then was extremely intractable and fatal. Happily this extension did not often take place. Blistered surfaces about the throat were apt to become covered with a sloughy looking exudation. A mishap of this kind occurred to a patient of mine, a little girl, aged six years, who had an extensive burn on the posterior surface of the body and extremities. The wound, though a severe one, was doing pretty well, until about four weeks after the accident, when she was suddenly seized with diphtheria; the wound immediately lost its healthy appearance, and in a short while became the seat of a yellow exudation similar to that in the throat. She became pulseless, and died within forty-eight hours. It would seem, then, that the exudation is not limited to mucous tissues or surfaces, but that it might be deposited on any denuded surface of the body.

The above symptoms are such as usually attend a tolerably severe case of the disorder as it prevails here. But they occur in every possible degree of severity, from the mildest to the most malignant, and point to a serious constitutional malady rather than a mere local one.

In regard to the treatment, much discrepancy of opinion for a while prevailed. The antiphlogistic plan, such as leeching, blistering, and calomel, with the local application to the throat of the solid stick of nitrate of silver, were tried until the great fatality of the disease demonstrated their utter futility.

These remedies were then dropped, and various gargles and poultices tried with but very little better success.

The remedies that have been most successful here, and upon which the greatest reliance is to be placed are: quiniæ sulph. ; potass. chlor. ; ferri tinct. mur. ; and argent. nit. Their value may be estimated by the order of enumeration. These have again and again been brought to the notice of the profession ; but as they seem unjustly falling into disrepute, I shall give, somewhat in detail, the method I have adopted, and which has been successful in about one hundred and fifty cases, failing in three only—one complicated with an extensive burn, and two others with pertussis. These were all cases of true diphtheria, and most of them severe.

In the first place, then, in the beginning of the disease, if there should be torpidity of the liver with constipation of the bowels, a purgative dose of calomel and rhubarb should be given. If, on the other hand, there is some looseness, the calomel should be combined with pulv. Doveri, and given to stimulate the alimentary secretions, and prepare the patient in some degree for what is to follow. Three or four hours after the administration of the above, a pill, containing from one to two or three grains of the sulphate of quinia, should be given (to adults), and alternated every two or three hours, according to the urgency of the symptoms, with the following mixture : R.—Potass. chlor. ʒij ; ferri tinct. mur. ʒijss ; aquæ ʒij ; a tablespoonful, diluted at the time of administration with an ounce or two of water, and this may be sweetened with white sugar to make it more palatable to children. For them, the dose must also be diminished in proportion to the age. These remedies must be given alternately, and must be continued day and night until some amelioration takes place in the symptoms. The quantity of quinia given in any case must be regulated by its effects on the brain. It should be given in as large doses as can be borne without causing too much cerebral disturbance, and be steadily continued until the membrane begins to be detached, and then at longer intervals or in diminished doses until the throat is clean, when it should be discontinued, and the mixture alone given until convalescence is pretty well established.

As a topical application to the throat there is nothing better than the nitrate of silver, which should be used in a solution of not more than six or eight grains to the ounce of water, and be applied twice daily by means of a camel's hair pencil or small mop, made by fringing linen, and attaching it firmly to a stick slightly curved at the extremity. This is a gentle lotion, and is just what is needed to stimulate the parts to healthy action. A cauterant is not indicated, and if applied, will often do injury, and the frequent use of nitrate of silver in stick cannot be too strongly condemned. Externally the volatile liniment is useful, and may be applied twice a day, and any degree of irritation can be kept up by a piece of flannel worn around the neck. The tincture of iodine is also a good counter-irritant, and should be preferred when the glands are much enlarged and indurated. Blisters are extremely pernicious, and should be entirely discarded from

practice. They greatly distress the patient, without in any way favourably affecting the disease; and they very frequently become gangrenous and unmanageable. The daily use of the warm bath is productive of much benefit, and should not be omitted. There is another therapeutic agent which must never be forgotten—pure air! Much harm has often been done by confining patients in close rooms, and excluding as much as possible the external air under the impression that cold will be taken. No greater mistake than this can be made. The patient should have free access to pure air, either by thorough ventilation or by changing from room to room, and airing well the vacated apartment against his return to it. The diet should be nutritious, consisting of fresh milk, rich soups, custards, and the like; and when the appetite is abolished, provided the stomach is retentive, small quantities of food must still be given at stated intervals, to sustain the patient and prevent the inevitable tendency to asthenia. It will often be necessary to resort to stimulants, such as brandy, or brandy and milk, for the same purpose. With these remedies early resorted to, very few cases proved fatal here. The treatment of diphtheria, to be successful, must be energetic from the very beginning. It will not do to give a little potass. chlor., and be content because the case is mild, and there seems to be no indication for other remedies. I know that the practice of resorting to these measures in mild cases, and in such as appear to be accompanied by some sthenic action, has been strongly condemned. We are told that it is time enough to give a remedy when the proper indication arises, that is, to wait for anæmia before we give iron, and for the debility before having recourse to quinia. This, in my humble judgment, is a great error—one that has often entailed upon the patient a long train of evils, and frequently cost him his life. The constant tendency of diphtheria is to asthenia, and life is either destroyed in this way or by an extension of the pseudo membrane to the larynx and trachea. By prompt, energetic action both these calamities may be averted. I have never seen this plan do harm, or in any way aggravate the symptoms however sthenic it might be, but, on the contrary, have invariably seen the pulse reduced in frequency, the countenance brighten, the local symptoms improve, and the extension of false membrane prevented by this course.

The sequelæ of diphtheria, as it prevailed here, consisted principally in paralysis of the vocal organs and slight functional disturbance of vision. This happened almost as often after mild cases as after the most malignant, and seemed to bear no direct ratio to the severity of the case. These symptoms generally come on during convalescence, or a week or two after the subsidence of the disease, and are, or were not of a very persistent or serious character, usually disappearing in a few weeks under the influence of tonics, and moderate exercise in the open air.

The above, I am aware, is an imperfect sketch of diphtheria. It is only intended as an account of it as it prevailed here. As before stated, it has

been my good fortune to have lost but few cases ; this I attribute wholly to the early and persistent administration of supporting remedies in the manner already indicated. It may be said that the type of the epidemic was more mild and less malignant here than elsewhere. But this, I think, is sufficiently controverted by the number of deaths caused by the disease.

ART. III.—*On the Mountain or Continued Miasmatic Fever of Colorado Territory.* By F. RICE WAGGONER, M. D., A. A. Surgeon U. S. A.

IN calling the attention of the profession to this form of fever, I do not wish it to be regarded as a new disease, but as an old and well-known malady of an unusual type, and, so far as our knowledge extends, purely occidental, and indigenous to Colorado and the Rocky Mountains, extending to Montana northward, and the Pacific westward.

During a four years' residence, during which I was engaged partly in private and partly in military practice, I have treated a full score of well-marked cases, and, without claim to skill or originality, I may say that I have resorted to a plan of treatment more successful than that hitherto employed by the practitioners of this section.

Mountain fever is the scourge of our pioneer miners, and its attack is regarded as next to fatal, either from a misapprehension of its nature and a wrong application of therapeutics by the profession, or from the proper remedial agents not being pushed far enough to secure their specific effects.

CASE I. Mr. W., aged 45, by occupation a farmer (ranchman), low stature, muscular, bilious temperament, had been exposed to much inclement weather and wet in the irrigation of his lands. Was attacked Sept. 29, 1862, with headache, daily increasing in severity, followed by general lassitude, listlessness, indifference to all things and persons around him. On the fourth day (Oct. 2) he applied to me for advice. His tongue was coated with rather a light bilious fur ; bowels constipated ; want of appetite, with slight tenderness of the epigastrium ; tension and heaviness of the stomach. In fact, up to this time all the premonitory cerebral symptoms had been periodical in their character, these being generally aggravated from 10 A. M. to 6 P. M., when they subsided more or less, and the patient rested comparatively well during a portion of the night. But each day brought aggravated symptoms, and at the time he came under my notice he was ready to succumb to the long and tedious fever. I ordered him the following : R.—Hydrarg. submur., radix rhei pulv.; āā gr. x; podophyllin gr. ss. M. ft. chart. ij. To be taken at 6 and 7 P. M. During the night it operated quite freely. Slight diaphoresis ensued.

Oct. 3, 10 A. M. Tongue more thickly coated, fur darker brown ; pulse 100, rather weak and compressible ; skin dry, but not harsh ; eyes sunk and watery ; no appetite ; much thirst ; tenderness of epigastrium increased,

but no irritation of the stomach; urine scant and high coloured; indisposition to move; never speaks unless spoken to. Dover's powder ordered in full doses, with an excess of ipecac.

4th, 10 A. M. Patient much the same, though symptoms had modified a little during the previous evening; but in the after part of the night had increased with the development of the day, as usual. Now there was slight delirium; he could tell but little of his previous night's rest. Pulse increased to 110, and correspondingly weaker; tongue more dry; in fact, all secretions were locked up; bowels had not been moved for thirty-six hours. Saline cathartic ordered. Spt. nit. dulcis, with two drops of tinct. veratri viridis, every two hours.

5th, 11 A. M. Has again a slight increase of symptoms generally. Cerebral complication was evidently becoming much aggravated, though there was no turgescence of neck or face, but, on the contrary, they were rather pallid. Cold applied to head. Spt. nit. dulc. was ordered, with sponging of the whole surface with soda water, which gave evident pleasure to the patient.

Thus my first case progressed from day to day. Quinia was given twice, twenty grains in twelve hours, within the first ten days, but with no effect. The cerebral disturbance much the same as in typhoid fever, but the other characteristics of that disease were absent; on the contrary, there was an habitual tendency to constipation throughout, and no tympanitis, epistaxis, or petechiæ.

The treatment was directed to keeping the bowels open and increasing the secretions generally. Now and then a mild mercurial, supported by beef-tea, a little wine, bark, etc. The pulse throughout was feeble and frequent. His attack lasted forty days, and then gradually convalescence took place, with an amelioration of all the symptoms. For forty days he remembered nothing that transpired, though at all times he was perfectly governable and obedient to his nurse, and we congratulated ourselves on its safe termination, though it did take forty days to accomplish it, the disease having been generally fatal.

I saw no other cases of like type until the fall of 1863, when, having entered the army medical service, I was stationed at Fort Lyon, C. T., on the Upper Arkansas River, about one hundred and fifty miles from the base of the mountains. The location is on the north bank of the river, on a low bottom, though above high water. The other side of the stream is yet more unfavourable to health, overflowing many thousand acres of land that support a perfect wilderness of grass, weeds, and creepers.

The summer was very warm; for weeks the thermometer indicated daily from 95 to 100 degrees, and was ultimately as high as 105 degrees.

We had in July and August a number of violent rain-storms, that flooded the earth for a few hours; but the soil being very sandy and loose, the water soon disappeared. The men were quartered in stone buildings with flat dirt roofs, that admitted the rain almost as readily as a sieve. On my recommendation, the commanding officer had them removed to the open field in tents during the remainder of the rainy season; but on returning to their quarters, these were found damp, and, I think, were influential in the development of the diseases that quickly followed; and, strange to say,

matters of such paramount importance are entirely overlooked by the department, while minor affairs received deliberate and grave consideration.

During the summer months the health of the troops was good, not more than two or three per cent. of the command were sick per month. However, September ushered in a new state of affairs, though nothing serious, yet an indicator of what was to follow. Out of a garrison three hundred strong, we had some ten cases of intermittent fever, two of remittent, and as many of diarrhœa and dysentery. The febrile cases yielded readily to quinia—gr. xx for intermittent, and gr. xxv for remittent; this, with proper preparatory treatment, generally sufficed.

The diarrhœa was checked by a full dose of sulph. magnesia, followed by opium and pil. hydrarg. mas. The dysentery was treated by sulph. magnesia in 3j doses every three hours, until a change was effected in the character of the stools. Occasionally a pill of opium was given after the above result was accomplished, always anticipating the next discharge with rather a full portion of the magnesia; cold water injections were used freely. I would state, *en passant*, that the saline treatment has succeeded admirably in my hands in chronic diarrhœa contracted in camp.

October brought us a type of fever identical with the case above narrated, differing only in being of rather a lower grade, with more soreness and tension of epigastrium and irritability of the stomach; many patients presented themselves with the characteristic soreness of the stomach, lateritious urine, general lassitude, and indisposition to help themselves, but would be returned to duty in a few days, quite well, after taking twenty to thirty grains of quinia, a mercurial cathartic, etc. Such cases, however, were of frequent occurrence through the month of September. I attributed to all these cases the same etiology.

My first two cases of the continued type appeared early in October, and were treated after the fashion of the first case above, and persisted for varying periods of thirty and thirty-five days before any marked signs of convalescence, and then twenty days more before the patient gained strength sufficient to walk one hundred paces from the hospital without fatigue. As I had no one to consult with, I determined after this to change my tactics, and resolved to push quinia until I obtained some marked effect. Although I was fully aware that in those cases, during the prevalence of febrile action, the use of quinia is forbidden by many authors and condemned by a large and respectable portion of the profession, yet I was not deterred, since it seemed to me that as the disease yields so readily to our great agent in milder forms, why might it not do so in its more aggravated ones, if the remedy were pushed proportionally?

I had not long to wait for other cases. Those patients which were to be affected with the continued type were recognizable at first glance when they entered the surgery, if they were not carried from quarters to hospital

on litters. Yet some presented themselves while they were able to be on their feet.

The cases of the continued type all presented an icteroid appearance, dejected countenance, eyes sunken and hollow, epigastric tenderness, urine highly coloured and scant. Delirium soon came on, and, as a general thing, in two or three days the "brave soldier boy" lost all consciousness of his whereabouts.

The most assiduous observation failed to detect any remission of the fever either by day or by night. The leading symptoms that now ensued were delirium; constipation, slight but not serious; gastric derangement; first a light, but later a dark furred tongue, though never concave and excoriated as in typhoid cases. Pulse from 120 to 130, usually small and weak; rarely any vomiting—if any, readily controlled; no enteric complication or tympanitis; hot skin, thirst, immoderate and continued burning fever.

It has been stated that this state of affairs was preceded in September by intermittents and remittents of ordinary type and grade, which readily yielded to not over large doses of quinia. Though perhaps some of our brethren may think twenty-five grains quite large, when given without special regard to remission of the fever, in five grain portions every two hours, I resorted to that practice.

CASE II. Henry W., private Co. K, 2d Cavalry of Colorado, admitted in hospital Oct. 20. Age 30 years; not robust, but rather stoutly built. On examination, presented all symptoms just detailed. Had only been indisposed about twelve hours. Ordered the following cathartic: Calomel gr. vj; podophyl. gr. ss. M. ft. chart. ij, to be given at 9 and 10 A. M. and at 6 P. M. It operated well.

Oct. 21. Bowels had been moved three times from previous cathartic. Fever quite high; confused ideas; delirium evidently approaching. Ordered salines, cold to head, and veratrum viride.

22d. Patient delirious; pulse 120; no veratrum had been given for twelve hours, patient having vomited, the nurse had discontinued it. Continuation of cold application to head. R.—Sulph. quiniæ gr. xxx; Dover's powder, gr. x. M. ft. chart. v, to be given every two hours.

23d. Patient worse; delirious; pulse about 130; no movement of bowels since evening of 20th. Ordered a full dose of calomel and podophyl. Late in evening operated twice.

24th. Ordered quinia gr. xl; sulph. morphiæ gr. ss. M. ft. chart. vj, one to be taken every two hours.

25th. Unchanged. Ordered sixty grains of sulph. quiniæ in five portions every two hours. Stomach by this time had acquired a perfect tolerance for anything. I know that this was heroic treatment, but was fully persuaded that the disease must yield to it. Doubtless a more timid practitioner would have desisted after forty grains had failed to produce any effect, yet I was determined to persist; and not until after the sixth of those ten-grain doses was taken, and after fourteen hours, did I obtain a truce. At this time my patient commenced to sweat, and as the night advanced, diaphoresis increased. I directed he should be kept well covered with blankets during the

night, for at this season of the year the nights had become rather chilly. The effect was decided. Next morning at eight o'clock, on entering the ward, I found my patient perfectly rational, and on interrogation as to how he felt, he exclaimed, "Bully!" He had no fever; his pulse was full, and but little above the natural standard; his clothes and the sheets where he had lain were thoroughly wet. Convalescence was rapid and most perfect.

CASE III. Corp. S., Co. K, 1st Cavalry of Colorado, aged 28 years; muscular and stout. Admitted Oct. 28. Symptoms same as in Case II. Ordered cathartic of calomel and podophyllin, which operated well during the night.

Oct. 29. Ordered sulph. quiniæ gr. 1 in six portions every two hours.

30th. Found patient no better, but growing worse as time progressed; delirious; passed a very restless night; pulse 120; skin dry; but slight irritation of stomach. Nurse thought he had vomited last quinia powder of previous evening. Bowels not moved since evening of the 28th. Ordered rad. rhei, with small amount of calomel and podophyl., with cooling drinks, and cold water to head.

31st. Bowels moved freely during the night, but patient no better, and no signs of remission.

Nov. 2. Ordered eighty grains of quinia in eight portions, one every two hours. Being rather more muscular than Case II., and symptoms more aggravated, determined to go to maximum at once, but gave directions, if any signs of remission appeared before all had been given, to leave off quinia at once.

3d. Seven portions had been given when sweating commenced, and continued the remainder of the night. Patient has entire remission of all symptoms. Tongue moist; pulse full and about 95; no delirium; offered him a little nourishment, which he took with some degree of relish. Convalescence perfect in a week's time.

These are samples of some twenty cases treated in like manner and with like results. No case yielded with less than sixty grains, and seventy-five was not exceeded in one day; and in no case did any unpleasant symptom follow, but most perfect convalescence.

It would be extending this paper too far to detail all the cases, and as these two are complete samples of the type of fever, and my treatment being the same in all, I think them sufficient. During the remainder of the fall I continued this practice, and did not lose a patient, all being promptly relieved by the early administration of quinia. In fact, a large majority never reached the febrile stage, which doubtless would have proved long and tedious had it not been for early treatment; only the two cases run their limits of thirty-five and forty days. As winter came on, this type disappeared, and nearly all the garrison that had escaped fever were affected more or less with jaundice, which affection yielded readily to blue pill and podophyllin. Podophyllin I consider a valuable adjuvant to mercury, the mercury depriving it of its drastic properties. It may be asked, Were the secretions yet dormant when the quinia was administered? I answer, yes. They were affected but little by the mercury first administered.

But in this I consider quinia one of the best cholagogues we have, not immediately, but secondarily. In every case, as soon as the fever was broken up, all the secretions, including that of the liver, at once commenced to flow.

My first case occurred in the mountains, where the weather is always cool, remote from any malarious district, and was very prevalent in 1859, the first year of my Territorial residence, and practitioners of that early day informed me that it could not be cut short, though they acknowledged they never pushed quinia beyond an ordinary dose. By the time I met my first case (narrated above) it had become very rare in that region. Doubtless it depended at an early day on the exposure and insufficient diet of our mining community, and, I think, would have yielded to large doses of quinia (from sixty to eighty grains), if any one had had the nerve to administer it.

Fort Lyon, as I have stated, is located favourably for miasmatic fevers, and I anticipated those affections on my arrival, and they came.

The question is in this country, Is it purely miasmatic fever, or a modified typhoid? I had been taught by my pioneer brethren that it was typhoid, without the enteric symptoms. But, accepting Prof. George B. Wood's theory that typhoid is enteric fever, and that typhoid dependent on ulceration of the glands along the track of the small intestines, which is undoubtedly the true state of affairs, and that typhoid without it is not typhoid, I called mountain fever continued miasmatic, and if miasmatic, it must yield to quinia if pushed to the degree corresponding to the malignancy of the type. It had been my habit, while practising in one of the Western States, to administer quinia in all bilious and remittent cases, with but little respect to the presence of fever, deeming that no contraindication to its use, as taught by most writers. I was taught to do so in my pupilage, by my preceptor, Dr. E. Penwell, a practitioner of undoubted skill; hence I had no hesitation in the administration of quinia in these malignant cases where a remission could not be obtained.

FORT GARLAND, C. T., Feb. 1865.

ART. IV.—*Pepsine Wine—a New Preparation.* By J. C. REEVE, M. D.,
Dayton, Ohio.

I AM desirous of laying before the profession my experience with a preparation which, although limited in the range of its application, is of no insignificant value among our means of combating disease. It was first proposed by Dr. Geo. Ellis, of Dublin, in the *Medical Times and Gazette* for July, 1862, under the name of "rennet wine," a term for which I pro-

pose to substitute that given above as at once more appropriate and more scientific. It is a vinous infusion of the calf's stomach, or rennet; such an infusion has been proposed before, but so little was known of it, and there being nowhere any definite instructions for making it, this may justly be called a new preparation. The peptic principle of the gastric juice is its active agent; who first proposed using this product of the animal economy as a medicine it is impossible to say (*U. S. Dis'y*, ed. 1865, pp. 1590-92), but its value as an aid to feeble digestion is substantiated by a large amount of respectable professional testimony, and has ever been a matter of popular observation. Pepsine itself has been for some time a standard remedy in European practice, but pepsine is the product of delicate chemical manipulation, and, so far as a remedy is concerned, cannot be obtained in this country out of the larger cities, and is unreliable when obtained. This preparation it is, therefore, believed will supply a desideratum by affording a cheap and convenient mode of obtaining and administering a valuable remedy, too little used because difficult to procure.

The medicine is easily prepared. A fresh rennet is obtained from the butcher, cut up into small pieces, and put into a pint of good sherry wine; after maceration for two weeks it may be strained off, and is ready for use. A ready test of its strength is to stir a teaspoonful into a teacupful of milk warmed to blood heat; this it should turn to the consistence of blanc mange.

The influence of pepsine in promoting digestion being granted or proved, the cases in which this wine will be beneficial are clearly indicated. Cases of feeble digestion depending upon debility of the stomach, this debility being either constitutional or the result of protracted and exhausting diseases, are particularly fitted for the use of the remedy. Dr. Ellis, the originator, recommends it for dyspepsia, apparently giving it without any selection of cases in regard to character or pathological conditions, and there is no doubt that it will yet take its place among the standard remedies for this obstinate and distressing complaint. He states his experience with it as having been very considerable and his confidence in it great. He has also used it with good effect for offensive odour of the breath in young persons. In one case cod-liver oil was tolerated and digested by its aid which could not be taken before. Another physician writes to the same journal of the benefit he derived from it in obstinate attacks of gastralgia, to which he was subject.

My own experience with the preparation extends over more than two years, and I have prescribed it pretty freely. My opportunities for using it in pure dyspepsia have not been numerous, but it has not disappointed me of affording relief in a single instance of the kind. For weak and anæmic females, with whom the stomach partakes of the general feebleness of the body, and lacks the power to digest the nutriment so much needed, I have found a teaspoonful of the pepsine wine taken after each meal a most excel-

lent remedy. The most striking benefit I have yet seen from it in adults was the case of a young lady who came under my care in an extremely feeble and emaciated condition, the result of a severe attack of typhoid fever. So great was the weakness and irritability of her stomach that the most carefully selected and prepared food could not be borne; a single spoonful of beef-essence, given ice-cold, almost constantly produced vomiting. The usual remedies for such a condition had been exhausted without effect when I recommended half a teaspoonful of the wine after every spoonful of food. The effect was marked and striking, and the agency of the medicine proved to the satisfaction of all by attempts to intermit its use.

But it has rendered me the most service in a class of cases which yield to none in the anxiety they cause to the physician, or the demand they sometimes make upon him for every means which he can call to his aid. I allude to cases of "summer complaint" in children, especially chronic cases, where the little sufferer is worn down by constant discharges, the digestive organs are enfeebled, and reject the most carefully prepared food, or are unable longer to digest enough to support the drain—a fatal termination following as much from debility and want of nourishment as from disease. Every practitioner meets with such cases; in our large cities, during the summer season, they are numerous enough—the trial of physicians and the affliction of patients. "In such cases the debility of the stomach is kept up by the want of due nutrition of the organ, originating in its own defective function; and it has, therefore, no power of recovering its healthy condition. Artificial digestion supplies the deficient nutriment, and the stomach, being now duly nourished, resumes its proper function." In such cases I have followed every administration of food with a dose of the wine varying from ten drops to half a teaspoonful or a teaspoonful according to the age of the patient, and I can say, without exaggeration, that I have seen more benefit result from its use than from all other remedies singly or combined. The vomiting has ceased, the diarrhoea become modified, apparently from supplying the system with nutriment.

There is another class of patients often brought under the care of the physician, for whom this wine is an excellent remedy. They are not suffering so much from disease as needing assistance in a struggle for life. Infants depending wholly or in part upon artificial food for their nourishment, frequently do not thrive, and require much care on the part of the physician, as well as the nurse, to bring them safely through the first two years of life. In such cases I have derived most valuable assistance from the use of pepsine wine as an aid to digestion. During last summer I had two babes under my care, neither of which had a drop of natural nourishment, and I fully believe neither of them would have been safely brought through the perils of a hot summer, tender age, and artificial food without the aid of this wine. To the young practitioner this may seem a matter of petty detail, but as he gains a more intimate acquaintance with the responsibilities

of his calling he will find that whatever will assist him in keeping unbroken the band of little ones in a household will be far from insignificant.

There is still another class of cases to which this remedy would seem, theoretically, well adapted, but in which I have had no opportunity of testing its powers. In the chronic diarrhœa of our army hospitals, the pathological conditions would seem so similar that I cannot doubt great benefit would result from its use. There seems to be the same demand for food rather than medicine, and the same inability of the digestive organs to prepare it for assimilation, these organs partaking of the same debility as the general system, and which is perpetuated by want of nutriment; once give power of digestion and the vicious train of morbid actions is broken and the cure almost assured.

I trust my testimony to the value of this simple medicine may be estimated sufficiently to induce a fair trial of its virtues, not only in army hospitals as above suggested, but by private practitioners. The coming hot weather will afford abundant opportunities, and if those who try it will publish the result of their observations they will render a service to some of their brethren, if not to science.

ART. V.—*Case of Fracture of Both Thighs.* By HEBERT SMITH, M. D.,
Assistant Surgeon U. S. Navy. (With a wood-cut.)

CHARLES D. MILLER, boatswain's mate, æt. 25, native of England, was admitted to the U. S. Naval Hospital, Pensacola, Florida, on the 19th September, 1864, with fracture of both thighs, caused by the falling of the smokestack of the U. S. Steamer Stockdale, three days before.

The fracture of the right thigh was very oblique at the junction of the upper and middle third, and complicated by a flesh wound on the outer side of the limb, not considered, at first, by the medical officer of the ship, as communicating, but which, upon further observation, was found to be in direct connection with the femur, proving that the fracture in that side was compound; on the left side the fracture was less oblique, and at the upper point of junction of the second with the middle fifth. There were numerous abrasions and contusions besides, particularly on the back, which latter embarrassed the position of the patient throughout the treatment. On admission he was found to be so comfortable upon a temporary double inclined plane, contrived on board the Stockdale, by Acting Assistant Surgeon T. M. Coan, U. S. Navy, that he was left undisturbed until some permanent apparatus could be substituted. On the 21st, two days after admission, a splint, devised by Fleet Surgeon James C. Palmer, and called by him a modification of "Smith's Anterior Splint," was applied. It

consisted of two continuous parallel rods, of No. 9 iron wire, passing over the anterior surfaces of both limbs from the toes upwards, arching over the pubes clear of the anterior spinous processes, and bent at the groins at an angle of about 30 degrees. The abdominal arch was well padded, and the whole apparatus, enveloped with roller bandages, as usual, was first secured at the pelvis, a trough of binder's boards being accurately moulded to the back of each thigh; bandages from the toes upward were next applied around each limb, including the splint, and when they reached the groins were secured to the arch on each side, and the ends finally carried over the mattress, clear of the patient's body, were made fast to the head of the iron bedstead, the weight of the body making the counter extension. Lastly, the limbs, separately slung, were suspended by a single cord passing over a pulley at the ceiling and making extension at an angle of about 30 degrees. A glance at the accompanying figure will render the whole arrangement easily intelligible.



A few hours after the application of the splint, it became necessary to loosen the bandages about the feet, and then the patient declared himself perfectly comfortable.

September 22. Passed a good night. The bandages were tightened about the thighs, and the patient sits up in bed or reclines at pleasure. The calls of nature are performed without inconvenience. The abrasions upon the back cause annoyance, but not severe pain, and he is in all respects comfortable, and raises his body by means of a rope over his bed.

October 6. Nothing worthy of remark has occurred since the last note. To-day the apparatus was found to have slackened down by stretching of the bandages, and it was readjusted throughout and secured as at first. The patient's general health is good, and he is allowed a pint of ale daily.

18th. The bandages were again tightened, without making any change in position, the apparatus having remained immovable since the adjustment on the 6th instant. The patient declares that the broken bones seem to him to be firmly united; he feels no motion at the points of fracture.

November 5. Fiftieth day after fracture, and forty-fifth since the application of the splint, all dressings removed; union found to be firm. Right limb three-eighths of an inch shorter than the left; united at a slight angle; salient outwards. Left thigh firmly united without any deformity. Patient placed in warm bath, and after passive motion had been employed was returned to bed with the pasteboard splints replaced upon each thigh and secured by bandages.

From this time passive motion was daily and perseveringly practised. He soon commenced using crutches with broad bases, and, but for timidity, could have walked without them. He stands erect without support, and it is only by careful measurement that any difference in the length of the limbs can be detected.

His height, as given by descriptive list when he shipped, was 5 feet 6½ inches, and after he began to walk without crutches it was found to be 5 feet 6 inches full, with the original difference of three-eighths of an inch in the right thigh.

It is proper to state, in conclusion, that since the apparatus was removed Dr. Palmer has modified it for future occasions by bending the wires outwards and downwards at the instep, and carrying them out parallel with the soles of the feet, so as to secure to their ends a copper trough, to which the patient's own shoes may be attached for support at the heels, where the chief difficulty was found in Miller's case and all others in which Prof. Smith's apparatus was applied.

[1865, Feb. 16. The patient walks with a cane, without apparent limping. J. C. P.]

ART. VI.—*Hospital Gangrene, treated by the Local Application of Buttermilk.* Reported by FRED. P. PFEIFFER, M. D., Acting Assistant Surgeon U. S. A. Communicated, with remarks, by WALTER F. ATLEE, M. D.

[THE application of buttermilk in the case here reported, was made at my suggestion after reading the remarkable paper of Dr. Jackson, "On the Uses of Sugar and Lactic Acid in the Animal Economy," contained in the April number of this *Journal*. Not being able to obtain any sour milk, as recommended by Dr. Jackson, to apply to the gangrenous wound, buttermilk was substituted. Since its employment in this case, it has been universally used as a local application, at the Satterlee Hospital, in all cases of sloughing wounds, and with the most satisfactory results. I have also used it as a dressing for stumps, immediately after amputation, and believe it to have had the effect of keeping parts free from odour that would, under other applications, have been offensive and sloughing.—W. F. A.]

Reuben Holladay, aged 19, private Co. A., 24th New York Cavalry, was admitted March 12th, 1865, into Ward P., Satterlee U. S. A. General Hospital, West Philadelphia, Pa., from Camden Street Hospital, Baltimore, Md., with a gunshot flesh wound of the left thigh. The wound was caused by a minie ball, at the battle of Hatcher's Run, Va., February 7th, 1865, which entered about four inches from the penis—below and on the inner surface—passed upwards and made its exit some three inches below the anterior superior spinous process of the ilium.

Both wounds were about one and a half inches in diameter.

The patient, when first seen, was much debilitated, pale, and eyes sunken. Bowels moved quite regularly, but a tendency to diarrhœa. He was able to walk to the water-closet for the first two days, after that he was confined to his bed.

His appetite was very poor; the tongue dry; his sleep was normal the first few nights. He seemed much tired out by his journey. Pulse quick and irritable. Prescribed: R.—Quin. sulph. gr. j; tr. ferri chlor., acid. sulph. aromat., aa gtt. v, M., ter die, with full diet the first three days. After that he complained of an occasional chill, nearly every day, alternating with considerable fever. Prescribed: R.—Pil. quin. sulph. gr. j, three times a day; and spts. æth. nitr. every hour till fever is reduced.

During this time his wound presented the following appearance: Both openings were deeply discoloured and covered with a thread-like film, and nearly black. They could not be probed. There was considerable swelling and redness surrounding the part.

The edges of the wounds had the appearance as if nitrate of silver had been applied to them, and could not be raised. There was also a disagreeable odour emitted from the wound.

The upper surface of the thigh was discoloured (dark blue and yellow); but which disappeared in a few days. Considerable pain was felt from the hip-joint to the knee. The whole was very painful to the touch. As a local application, water-dressings were much used.

The symptoms remained unchanged, and the local treatment was con-

tinued till March 26th, when hospital gangrene made its first appearance. The wound then had increased to nearly double its size; the parts around were more tumefied. The natural heat and sensibility of the limb seemed to be diminished. The discharge from the sore was horribly offensive. There was a great, and I think rather sudden, depression of the vital powers. The pulse rapid and feeble, the countenance cadaverous, and the surface of the body covered with a clammy sweat. Also had some eructations and slight cough.

Continued tonic three times a day—spts. vini gallici f3j, every two hours; milk-punch, egg-nog, beef essence, and all the extra diet that could be obtained.

Cleaned the wound out with acid. nitric. dilut., and filled both openings with common brown sugar; syringed the wound with a solution of sugar, and covered the whole with oakum. Dressed wound four times a day.

March 27th. No change. Continue treatment.

28th. Patient visited by Dr. W. F. Atlee, Consulting Surgeon, and ordered spts. vini gallici f3j, every hour; pil. opii gr. j, every two hours. Watch him close. Wound growing larger and more offensive. Pulse 104.

29th, 1 A. M. Complains of slight sore throat. Pulse 108; mutters and moans in his sleep, and is easily aroused out of his comatose condition; hearing rather dull, and slow to answer questions.

31st, 9 A. M. Continue treatment, but use instead of acid. nitric. dilut., solution potass. permang. (f3ss to f3j), five to six times a day.

The patient has vomited dark, green, watery matter, with great irritability of stomach. Give him small pieces of ice to swallow. (Much benefit was derived from a few bottles of Roussell's mineral water.) Retains no food—nothing but brandy. *1 A. M.* No change; rests easier; pulse 104.

April 1. Irritability of stomach the same. No change. Continued treatment. Stop opium pills.

2d. Has a large bed-sore about two inches in diameter, over sacrum, gangrenous, of a black colour all over. Poultice: pulv. sem. lini.

3d, 10 A. M. Pulse 104. Spts. vini gallici f3j, every hour. Continue treatment—eggs and anything else he can eat.

Divided the part between the two openings; laid flaps aside. Sensibility of the parts lost altogether. Bed-sore discharges to-day a yellow matter, which is secreted in abundance under the edges; has increased in size.

4th, 10 A. M. Pulse 96. Sloughing of wound and bed-sore considerable. Length of wound eight inches, and width four inches. Muscles and vessels of thigh exposed, and the tissues all destroyed. Fears are apprehended of hemorrhage from the femoral artery; have, therefore, made every preparation to meet the event. Tongue clean and moist. Continue treatment. *12 M.* Pulse 100. *1 P. M.* Has just taken some rice pudding, but not much. Bowels rather loose; dark stool. Liquor sodæ chlor. under his bed as disinfectant.

5th, 9½ A. M. Pulse 96. No change. Continue treatment. *7 P. M.* Pulse 100.

6th. The wound is still enlarging, and no change. Was recommended by Dr. W. F. Atlee to use *buttermilk*, instead of sugar and solution potass. permang. Syringed the wound with the buttermilk, and saturated some patent lint with the same, and laid it in the wound. Dressed the wound five to six times a day. (*9 A. M.* Pulse 120.)

7th, 9 A. M. Pulse 96. To our great surprise and astonishment found instead of a ghastly, offensive, sloughing wound, a *clean, sweet-smelling*

wound. The change was so great that it can be better imagined than described. Patient feels well, but rather weak. Is in excellent spirits.

8th, 11 A. M. Continue treatment of buttermilk and tonic; brandy every hour.

9th. Improving. 9 A. M. Pulse 96. Continue treatment. Has some appetite.

10th, 9 A. M. Pulse 96. Improving; wound doing nicely. Continue treatment.

11th, 9 A. M. Pulse 84. Growing better; wound around and underneath the edges healing. Continue treatment. Brandy once in three hours.

12th, 10 A. M. Pulse 68. Has a good appetite; is in good spirits, talkative, and is doing as well as can be expected under any circumstances.

13th, 9 A. M. Pulse 104. Wound healing finely; bowels loose, watery, and of a light colour; some pain in bowels. Appetite good; sleep regular. Continue treatment.

14th, 9 A. M. Pulse 96; bowels the same, otherwise improving. R.—Pulv. Doveri gr. v, three times a day. Wound looks very healthy, and under the edges it is nearly healed. Says he has a craving appetite.

15th, 9 A. M. Pulse 96. Still improving; bowels better. Continue treatment.

16th. Wound very rapidly healing. Continue treatment. Pulse 100.

18th. Pulse 96. Still continues to improve, and wound doing nicely. Stop pulv. Doveri.

20th. Pulse 92. Tongue clean. Continue treatment.

22d. Pulse 108. Bowels costive; otherwise no change. Continue treatment.

24th. Pulse reduced to its average of 96. Bowels regular.

27th. Patient does not complain of anything; has a very good appetite; sleeps well.

30th. Pulse 96. Continue treatment.

May 1. Patient is doing exceedingly well. Brandy fʒj, every four hours. Continue treatment.

3d. Improvement can be noticed every day in patient. Continue treatment.

5th. The wound is rapidly closing in the centre, and has healed out entirely under the edges.

7th. Since my last report the wound has healed in the centre and closing very rapidly. No pain of any kind, and moves his limbs around with much freedom. Has asked permission to sit up to-day, as he says he feels quite strong, which was granted for a short time. Continue treatment.

10th. Patient sits up every day. The case progresses with remarkable rapidity. Pulse 84.

13th. General health good; bed-sore very nearly closed.

ART. VII.—*Treatment of Gonorrhœa in the Female.* By JOHN J. BLACK, M. D., one of the Resident Physicians to the Philadelphia Hospital, Blockley.

THE following is a *résumé* of the treatment and its results as practised in one hundred and seven cases of gonorrhœa in the female during the

past winter. In many patients the mucous membrane of the upper part of the vagina was involved, as well as its reflections over the neck of the uterus. In no instance was there any great constitutional disturbance from implication of the pelvic viscera, although in some cases where the patients had neglected to place themselves under proper treatment at an early day, the cavity of the neck of the uterus appeared to be affected with subacute inflammation, doubtless a result of the prior trouble. All cases were examined by the speculum at the first visit, the size of which was regulated by the amount of inflammation present. Although many authorities reprobate the use of this instrument in the inflammatory state, our experience with it here is most satisfactory, as we are thus enabled to make a thorough examination and obtain a full view of the parts implicated. Using, as we do in these cases, the smallest size glass instrument, well oiled, and introduced with gentleness, it gives the patient very little inconvenience.

In regard to the management of gonorrhœa, we acknowledge but one rational plan of treatment; we regard it as an inflammation, and treat it as such, whether in man or in woman. If the inflammation be very acute, we give antimonial mixtures, with some soporific if required; decrease the diet, and make applications of lead-water and laudanum, or a large flaxseed poultice over the external genitals. At the same time we generally order injections of water, of a temperature best suited to the feelings of the patient, medicated with a little extract of opium, to be used every three or four hours. This plan of conforming the temperature of all applications to inflamed surfaces to the sensations of the patient we have found to be of the greatest importance, especially in these cases, and productive of the greatest benefit. Under this treatment, generally in from twenty-four to forty-eight hours, the tumefaction and redness subside, and the patients express themselves as much relieved. In twenty-four hours more, the local inflammation subsiding, we commence with astringents and other such remedies. Now come the important questions: In what form shall we apply these remedies? Of what strength shall we use them? And what advantage does any one possess over another? First, as to the form. After a short trial of injections, we abandoned them in this stage of the disease. Their application was more or less annoying to the patients, and if trusted to themselves they were imperfectly applied or neglected altogether. The application of ointments spread upon cloth we found more efficacious than injections. The citrine or red oxide, or comp. iodine ointments, diluted from four to seven times with lard, were found to be among the best. Far preferable to either of the former methods is packing the vagina with strips of patent lint or soft cotton cloth, five inches long by two inches wide, soaked in a solution of the required salt. We found those cases to do best where the vagina was packed moderately full, care being taken not to interfere with the urethra. This packing was allowed to remain twenty-four hours, and the patients appeared to suffer little or no inconvenience. The great advan-

tage gained by this method is the keeping the walls of the vagina entirely separated. Of course this dressing must always be applied by the medical attendant, and always with the speculum. One great objection to it, as well as to injections, is that they both more or less soil the clothes from the contact of the remedies used; unfortunately the best remedies leaving the most indelible stains. In view of the objections to these remedies, after a little thought, we were led to use vaginal suppositories, made of some mild substance as a vehicle.

The result has more than equalled our anticipations. The vehicle being bland and soothing, the patient experiences no unpleasant sensation from the presence of the suppositories. The ease of their application is one of their greatest recommendations, the patient being able and willing to apply them herself; whereas they cannot or will not apply the cloth packing so as to be productive of any real benefit. By their use the frequent introduction of the speculum is avoided, which is a great relief to the patient. We have found them to be equally available for the application of remedies to the vagina and os uteri in non-specific discharges.

We herewith present several formulæ, which we have used very extensively and with great satisfaction.

R.—Ol. theobromæ, ℥xij; morphiæ sulphatis, gr. vj; liq. ferri persulph., gtt. cxlv; cerat. adipis, ℥iijss. M. et fiant suppositoria xij.

R.—Aluminis pulv., ℥iij; acid. tannici, ℥ij; ext. opii, gr. xij; ol. theobromæ, ℥xij; cerat. adipis, ℥x. M. et fiant suppositoria xij.

R.—Ol. theobromæ, ℥xij; ungt. iodinii comp., ℥vj; morphiæ acetatis, gr. vj. M. et fiant suppositoria xij.

R.—Ol. theobromæ, ℥xij; morphiæ acetatis, gr. vj; unguent. hydrarg. nitratis, ℥v. M. et fiant suppositoria xij.

R.—Ol. theobromæ, ℥x; morphiæ acetatis, gr. vj; ol. copaibæ, gtt. cxlv; cerat. adipis, ℥viiij; acaciæ pulv. q. s. M. et fiant suppositoria xij.

The favourable action of the local application of copaiba is contrary to what has generally hitherto been reported concerning it.

R.—Ol. theobromæ, ℥xij; morphiæ acetatis, gr. vj; liq. zinci chlor., gtt. cxx; cerat. adipis, ℥x. M. et fiant suppositoria xij.

We also tried the oil of turpentine by this method, but it appeared to exert no influence over the disease. Bromine was also tried, but its volatile nature prevented its use in this manner. We selected a number of cases as nearly alike as possible for this suppository treatment; all the cases being recent. The average number of days required for the cure was as follows: Liq. ferri persulph., nine days; alum, tannic acid, etc., nine and one-half days; ol. copaibæ, twelve days; comp. iodine ointment, thirteen days; citrine ointment, fourteen days; chloride of zinc, nineteen days.

The suppositories were not applied during the menstrual period, but that time was deducted in the average. I think they might be used during the

menstrual period, and thus possess an additional advantage in not causing a suspension of treatment during that time.

These cases were all thoroughly cured, having been examined ten days after treatment ceased, and found to be well.

We generally ordered one suppository to be inserted every other day, having found by repeated examination that the action of each continued at least that length of time, especially those of the iron, and those of the tannic acid and alum.

Then, to sum up: We claim for the treatment of gonorrhœa in the female by vaginal suppositories the following advantages:—

1. Efficiency equal to, if not greater than, other remedies.
2. Cleanliness.
3. Portability.
4. Ease of application.
5. Soothing properties, while rags and the like irritate.
6. Frequent application of speculum avoided.
7. Their presence not disagreeable.
8. They can be used at all times.

In regard to the strength of the remedies used, our experience with the suppository treatment has demonstrated that the combinations and proportions used in the accompanying formulæ are entirely satisfactory.

As to solutions for packing the vagina, we used them chiefly of three different strengths: gr. iij ad ʒj; gr. v ad ʒj; and gr. x ad ʒj; and altogether obtained much the best results from the three and five grain solutions. Even if the case was old and the parts almost destitute of sensibility, we still found, in the great majority of these cases, that the strong solutions were inferior to the weaker. Now and then we found one of those chronic cases, which we could overwhelm with a strong dose, but generally they proved irritating and rendered the patients uncomfortable for a time, whereas the milder proportions in like cases steadily and rapidly effected a cure. If we wished an immediate and positive impression, we now and then pencilled the walls of the vagina and cervix uteri lightly with solid nitrate of silver, and then kept the walls apart by inserting a strip of cotton cloth. We do not think that even this procedure had any advantages over milder and less unpleasant applications. In gonorrhœa within the cervix uteri we always used the solid stick of nitrate of silver, and with good results, as the membrane here seemed far less sensitive than that outside. Where the gonorrhœa extended into the urethra, which was rare, we generally injected a three or five grain solution of persulphate of iron or nitrate of silver with most satisfactory results. Now in regard to the remedies used, they were numerous, and each submitted to a fair and impartial trial:—

Persulphate of iron; nitrate of silver; permanganate of potassa; sulphate of copper; sulphate of zinc; acetate of zinc; tincture of iodine; and chloride of zinc.

We were pleased with the results from the persulphate of iron above all others, acting, as it did, as a powerful astringent and stimulant. From three to five grains to the ounce of water is the best proportion in which to use this salt. Next we preferred the nitrate of silver in the same propor-

tions. Next to the nitrate of silver we obtained the best results from the sulphate of copper, seldom using it over five grains to the ounce of water. Next comes the sulphate of zinc. Next the acetate and chloride of zinc, in about the same proportions, using for the latter the liq. zinci chlor., from three to six drops to the ounce of distilled water. From the tincture of iodine we did not receive very favourable results. Diluted one-half, as recommended by some, it proved very irritating, and produced excoriation of the parts. Still more diluted, its action was far inferior to any of the above mentioned remedies.

From the foregoing observations, then, we conclude, that in treating gonorrhœa in the female (and our experience is the same in non-specific inflammations of the vaginal mucous membrane), the milder remedies are superior to the stronger, whether the trouble be of longer or shorter duration. The comfort of the patient is more surely maintained; the disease more rapidly advances toward a cure, and the parts are sooner returned to their normal sensibility.

As not altogether foreign to the subject we wish to make known here the very favourable results obtained by us from the application of bromine as a caustic to chancre. It was applied thoroughly by means of a pine stick or glass rod to the sores, and then covered with an oiled rag for a few hours, and afterward treated, generally, by what we prefer in these cases, the common black wash with extract of opium added. In a short time the slough comes away, and leaves a beautiful healthy granulating surface. It does its work thoroughly and efficiently, whether the chancre be hard or soft, and in the phagedenic chancre we found nothing whatever to approach it in effectiveness. One application was generally sufficient, and its virtue seems to rest in its great destructive power, which causes it to clear away at once the unhealthy tissue, which act it takes several applications of most of the popular remedies to perform.

ART. VIII.—*On the Antagonism of Atropia and Morphia, Founded upon Observations and Experiments made at the U. S. A. Hospital for Injuries and Diseases of the Nervous System.* By S. WEIR MITCHELL, M. D., Wm. W. KEEN, M. D., and GEORGE R. MOREHOUSE, M. D.

DURING our connection with the U. S. A. Hospital for Injuries and Diseases of the Nervous System, we have been obliged to resort to every possible expedient for soothing the pain of those terrible cases of neuralgia, which in some shape are apt to follow as a consequence of neural injuries. Among these means incessant use has been made of hypodermic injections,

which alone in many instances seemed able to overcome the anguish of certain forms of neuralgic distress. To what extent we have employed this mode of relief may be gathered from the fact that, at certain periods of our service, the resident surgeons made every day from twenty to thirty subcutaneous injections. In one case half a grain to a grain of morphia was injected thrice a day, and the man finally recovered after having used nearly four hundred injections.

We were naturally led to examine with care into the pretensions of the several agents which have credit for their power to lessen or destroy the sense of pain. The results of this inquiry were of the more value, because they were confined to the use of these agents by injection only, and because they were studied by more than a single observer. Our investigation brought us finally to consider the therapeutic relations of atropia and morphia, to which subject the greater bulk of this paper will be devoted.

The information which our note-books give in regard to the comparative value of remedies used to allay pain, is the result of an almost unexampled experience, and we shall not hesitate briefly to relate it before passing on to our main topic.

After repeated trials of conia, atropia, and daturia, with the intention of relieving pain by their subdermal use, we ceased to resort to them. On the other hand the employment of morphia, or of some preparation of opium for subcutaneous use, became a part of the every-day routine of practice.

Like others, we have met with certain inconveniences attendant upon this mode of employing morphia. In rare cases it always caused distressing sick stomach, but as the pain for which we used it was oftentimes agonizing, the patient usually preferred to endure the sick stomach rather than fail of the delightful relief he obtained from the injection. In these instances it was commonly observed that the morphia ceased after a time to produce either nausea or emesis.

The local annoyances resulting from injections so long continued and so numerous, were sometimes very embarrassing, for though in some men they could be used in the same limb week after week, in others the numerous punctures produced a very unpleasant increase of sensitiveness in the part. Such an instance may be found on page 151, Case 31, of our treatise on wounds and other injuries of nerves. In other persons the injections gave rise to occasional abscesses, and in a soldier who was at one and the same time the subject of a very painful wound of the arm, and of a cold abscess on the back, every injection gave rise to a large indolent abscess. One instance of erysipelas following the use of an injection was seen by us. (*Op. cit.*, p. 150.)

As the opinion of many good observers is quite decided as to the fact that the injection gives the same relief, whether made near to or remote from the seat of pain, we may with reason be asked, why we used so many injections in the same limb or neighbourhood. The answer lies in the fact

that our patients very early, and we ourselves later and more reluctantly, reached the conclusion that the point at which the injection was to be employed was not a matter of indifference. In the milder instances of neuralgia a subdermal injection of morphia used anywhere in the body did give relief, but in cases of "burning neuralgia," such as we have described in our book on nerve wounds, p. 100, *et seq.*, the nearer we could bring the agent to the place where the pain was felt, the greater was the ease obtained. We are the more anxious to insist upon this matter, because we neglected to make the same comment when detailing our mode of treating these lesions in the volume above mentioned. The belief thus reached is certainly not altogether unphysiological, as we very well know that morphia is capable of causing a local paralysis of sensory nerves, with which it may come in contact.

While conducting the inquiry, some of whose conclusions we have just stated, it occurred to us that possibly the antagonistic influences of morphia and atropia might be so utilized as to enable us usefully to employ them together or in succession. With such a purpose subdermal injections of the two medicines were used, sometimes together, at other times one after the other. The result of these observations proved at once so interesting and so puzzling, that we finally entered upon a deliberate course of experiments with the intention of ascertaining in what respect and to what degree, and through what periods of time, the two drugs in question were antagonistic. While the final conclusions thus reached by us have served in a measure to strengthen the belief in the mutual power of these agents to counteract one another in the economy, they have also brought to light a range of very curious facts, which we think are novel, and which could certainly not have been learned from any course of experiments upon animals lower than man.

And here it is not unfit that we should criticize the loose way in which therapeutic inferences have been drawn from experiments upon animals, where of necessity poisonous doses have been employed, and their effects studied. Most of the symptoms which ensue when a course of any ordinary narcotic has been taken are so completely subjective that we can learn their existence only by the statements of the person who feels them. Even when these drugs are given in poisonous doses to animals, it does not follow that the resultant symptoms will, either in degree or in kind, correspond accurately to those which occur under like circumstances in man. Dr. Anstie, in his recent work on narcotics and stimulants, has very well illustrated this proposition. We ourselves have seen a dog recover after the subcuticular injection of *twenty-five grains* of atropia thrown in divided doses into various parts within a few minutes.

The temptation to study poisons in cold-blooded creatures is always very great, because in these animals certain facilities for toxicological study are

presented which do not elsewhere exist ; but, as might be expected, analogies fail us more and more as we pursue our researches upon creatures remote from man. No more striking example of this is to be met with than one of us, Dr. Mitchell, has recorded in the *Journal de la Physiologie* for January, 1862, where the author details at length a series of experiments upon snapping-turtles, whom he attempted to poison with woorara.

In this paper it is shown that while only $\frac{1}{96}$ of a grain is required per pound of the animal to destroy a rabbit within a few minutes, the snapping-turtle is poisoned with difficulty, and not surely by $\frac{1}{7}$ of a grain for each pound of its weight.

It would be easy to extend these examples, and to show, not that we should cease to use animals for the study of poisons, but that in order to appreciate properly any toxic agent, we must follow its effects through a wide range of created existence from vegetable to man, and that its therapeutic uses are to be learned only from its influence upon the being to whom finally it is to be of medicinal value.

The experiments which we shall now relate were most of them made upon soldiers who were suffering from painful neuralgic diseases, or from some cause entailing pain. In some cases, however, convalescent men were the subjects of our observations, but in no instance were they allowed to know what agents we used, or what effects were expected.

All of the drugs employed were injected under the skin, so that we desire to have it most distinctly understood, that we do not extend our inferences and results to the administration of these same drugs by the mouth. Thus given, their rates of absorption may vary so as to produce no inconsiderable modification of their relations to one another, although, as we very well know, their general antagonism would remain the same.

Antagonism of Atropia and Morphia.—The mass of evidence in favour of this belief is now considerable, and has increased since Dr. Wm. F. Norris summed it up in a very excellent paper in the number of this journal for October, 1862. And while the positive evidence in this direction has gained largely, it has been shown repeatedly that the negative evidence derived from experiments on animals is not to be trusted, although to it Dr. Brown-Séquard (*Journ. de la Phys.*, Oct. 1860, p. 726) has given the sanction of his great authority.

Assuming therefore that there is such a peculiarity of power in these two alkaloids as to enable them in man to neutralize one another physiologically, as acid and alkali may do chemically, certain questions arise with which we here propose to deal.

If it were clear that these two agents acted in some simple direct way upon an economy equally as simple, the problem before us would indeed be like the case of acid and alkali, and present to us little that was confusing or difficult to comprehend. If, on the other hand, each of these drugs acted with equality of force, but in opposite ways upon numerous organs of a

complex being, the question would even then be simplified. But it seems to us that although both atropia and morphia have a wide range of influence in the body, that they do not act oppositely throughout the whole sphere of their activity, while in some part of it at least, there is even a certain amount of correspondence between them, or at least the appearance of this.

We shall consider first the effect of morphia and atropia upon the circulation and respiration, and shall then observe whether a different result occurred when the two were given together in doses such as experience taught us were therapeutically equivalent.

Do these two agents act differently on the circulation, and if so, do their effects neutralize one the other? This question was answered by a series of observations in which certain doses of either morphia or atropia were injected subcutaneously and the result studied.

Effects of Morphia on Circulation and Respiration.—The subjects of our experiments were men free from fever. Some were suffering from neuralgia, and some were men in very fair health, suspected of malingering. The doses used were, one-third or one-fourth of a grain of sulphate of morphia in solution. The patient was kept recumbent for some time before and during the observation.

The above amounts produced no striking effects on the circulation. In two out of eighteen cases the pulse rose from 6 to 10 beats within a half hour. In 6 it did not alter materially during several hours, and in 10 it fell an average of 8 beats only. The respiration was as little affected. It appears then that in persons free from fever subdermal doses of $\frac{1}{3}$ to $\frac{1}{4}$ gr. of sulph. morphia do not conspicuously influence the heart or lungs. It is proper to add that the pulse became fuller under the morphia, and that this was at its maximum when the general influence was greatest.

Effects of Atropia on the Circulation and Respiration.—In about one-third of our cases the pulse fell within four to ten minutes after the injection of one-fifteenth to one-thirtieth of a grain. The fall did not exceed eight beats in any case. In the remaining cases the pulse was unaffected for a few minutes, but in one and all there was a rapid rise after the seventh or eighth minute—a rise which at its maximum was rarely less than fifteen beats, and in most instances forty beats per minute. The pulse reached its highest number within an hour in the great mass of our cases.

The fall was more gradual. At or about the fourth hour the pulse was commonly beating nearly the same number as it did when the observation began. It continued to fall, however, and the minimum was reached at the tenth or eleventh hour. From this period it rose again to its normal starting-point, which it attained within the twenty-fourth hour.

Shortly after we began to make these observations, Dr. J. C. Da Costa, in charge of the wards for diseases of the heart, in Turner's Lane Hospital, studied the influence of atropia upon the heart in a large number of cases of soldiers affected with functional disturbances of that organ. He

obtained results which do not differ essentially from ours, except that the primary fall of the pulse was more constantly noted. We are under the impression that we should also have met with it more frequently if our first examination of the pulse had always been made within the first five minutes after the injection of the medicine.

The following records may answer as examples of the general character of the changes in the pulse-rate after a single full subcutaneous dose of atropia.

INJECTED UNDER THE SKIN OF THE ARM

One-thirtieth grain of sulph. atropia.

One-fifteenth grain of sulph. atropia.

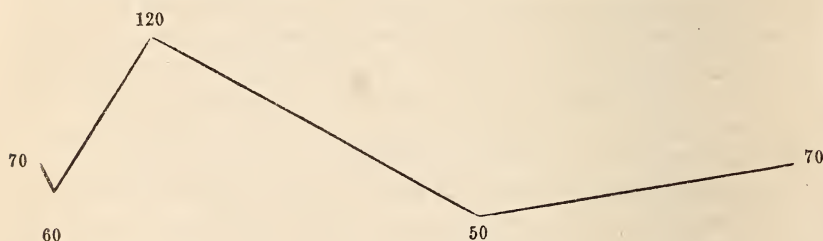
Pulse 80

7th minute	76
17th do.	106
30th do.	108
48th do.	106
90th do.	88
3d hour	78
5th do.	60
7th do.	56
10th do.	52
14th do.	60
24th do.	78

Pulse 62

10th minute	56
27th do.	108
80th do.	94
3d hour	64
4th do.	62
6th do.	66
8th do.	64
10th do.	50
24th do.	70

Taking the above cases as illustrations, the pulse curve under atropia might be thus represented.



The force of the pulse, as well as its fulness, was notably diminished throughout the rise in its number.

We, as well as Dr. Da Costa, were much struck with the fact that the rate of respiration did not increase as the pulse rose. Indeed, in many instances the number of respirations fell or remained unaltered, while the heart beats ascended from 70 to 120 per minute.

In the next series of experiments we endeavoured to learn whether, when full doses of morphia and atropia were injected together, the pulse would be modified so as to alter the curves which we have drawn as expressing its changes under the use of the latter agent.

These observations were checked by two other sets of experiments. In one we gave a full dose of morphia subcutaneously, and when the pupils

were well contracted, or the cerebral influence clearly marked, the atropia was employed. In the other we gave the atropia first, and when it began to show an effect on the pulse we injected a full dose of morphia.

In each and all of these methods we obtained like results, the pulse obeying the same law as when atropia alone was injected; in other words, behaving as though no morphia had been employed.

It thus appears that the influence of atropia on the pulse and respiration is in no way altered by the use of full doses of morphia, so that in this particular their supposed antagonism does not exist.

Effect on the Eye.—It is needless to show anew that atropia dilates and morphia contracts the pupillary aperture. Our observations consisted in using injections of both drugs in succession or together so as to note how they influenced the iris. Their antagonism was here very plain. When, in the case of a man whose pupils were dilated by atropia, we gave morphia, the pupil began to lessen within half an hour, and either became normal or else contracted. It was noticeable that the accommodation often remained paralyzed for an hour or more after the pupils had been relieved from the effects of the atropia.

These observations taught us also that when neutralizing doses of the two drugs were made use of the influence of the morphia was sure to pass away first, so that the pupils would become dilated again within five to ten hours, or unless a second dose of the morphia were given.

It was of course found difficult to regulate the doses so that they should always neutralize one another precisely, even for a brief period, and hence it was common to see, as above stated, a condition of complete antagonism prevailing for a time only, when one or other medicine would dominate the system. As a general rule, about one-quarter of a grain of morphia will neutralize for a time one-thirtieth of a grain of atropia, but the latter acts far longer than the former.

We may infer that these two agents counteract one another as regards their power to alter the size of the pupil and affect the ciliary muscle.

The *effects of the two drugs upon the cerebral functions* were studied separately, with care, and then in a second series of observations they were used together or in succession.

When in any particular case we found that some one of the well-known specific effects of either drug was always and markedly shown, we tested the antagonism as to this symptom by giving the other agent.

Here, as elsewhere, the judgment is apt to be led astray by one of the drugs overlapping, so to speak, the period of the other one's activity. We feel confident, however, that the following symptoms, caused by atropia, for instance, are lessened or lost when the system is under the action of opium.

The headache and phantasms of atropia are certainly thus controlled, as well as the partial deafness and visual defects, which, in high doses, it occasions. On the other hand, when morphia has been fully used, the

drowsiness and stupor, which are the best tests of its power, disappear before the influence of atropia.

In like manner the opium pallor and the flush from atropia may be modified or dispelled. Perhaps the most peculiar cerebral symptom of atropia is its tendency to cause phantasms and illusions. We found that under doses of $\frac{1}{25}$ of a grain these were common, and in some men could always be thus brought on. Usually they were absent so long as the eyes remained open, but arose at once upon closing them. This condition was singularly subdued by morphia.

Drowsiness caused by morphia was as surely lessened or destroyed by the counter-agency of atropia; and, in fact, atropia, given alone in full dose, is very apt to cause a restless night to follow, so that it is assuredly in no sense a true hypnotic.

Both morphia and atropia check the secretions from the mucous surfaces, so that in this respect they can scarcely be deemed antagonists, although the influence of atropia in drying the mouth is much the more striking of the two, while it has no tendency to constipate the bowels, and even in some cases produced loose stools.

Nausea.—Morphia was very apt to cause nausea when injected subcutaneously. In some men it never failed thus to affect them. When to such persons we gave the two drugs in equivalent doses—that is to say, doses which controlled the pupil, and perhaps after a time dilated it—we still found that nausea occurred as when only morphia had been employed. Here again the antagonism fails.

Effect upon the Bladder.—As regards the bladder, we obtained results which very much surprised us. It is well known that morphia causes dysuria in some persons. This is apparently due to a partial and temporary loss of power to contract that viscus. That such is the cause is shown by the sluggish motion of the stream of urine which flows, when, by a great effort, the patient has succeeded in beginning to micturate.

We found, to our surprise, that in many men injections of $\frac{1}{15}$ to $\frac{1}{30}$ grain of atropia sulphat., used subdermally, gave rise to a state of things so exactly similar, that one might have supposed it the effect of morphia. Consequently, when we selected such cases to test the antagonism of the two drugs in this particular, we were prepared to find that the dysuria was in nowise modified. Indeed, in some of these instances the symptom was so conspicuous as to give rise to the suspicion that the exhibition of the two agents together had occasioned a greater difficulty of urinating than arose from either of them when used alone.

It thus appears that, as regards the bladder, atropia and morphia do not antagonize one another, and that there is some reason to suppose that they act alike on this organ.

Pain.—The most important use of morphia in medicine is to lessen pain. Its power to do this we are naturally disposed to associate with its sleep-

compelling virtues; yet, in reality, the two powers are distinct enough, although both are possessed by this potent drug. How much apart they really are may be learned by the fact which we have discovered, namely, that while atropia destroys the narcotic effect of morphia, it leaves nearly undisturbed its power to lessen or overcome pain.

This interesting conclusion was thus reached: Several cases of intense neuralgic suffering were selected. In each of them we ascertained, by repeated trials, what dose of morphia would restore the patient to entire ease. Next the same patients were treated with full injections of sulph. atropia, $\frac{1}{15}$ to $\frac{1}{48}$ grain, in order to see whether or not it would control the pain. How utterly wanting in this power it seemed to be, we have already stated.

The third series of observations consisted in injecting the two drugs together or in succession. Somewhat to our surprise, the morphia still appeared to possess its full and perfect power to destroy the sensation of pain.

These experiments were so varied and so numerous as to leave us no room to doubt the correctness of our final belief, that, as regards its anæsthetic property, morphia is not counteracted by atropia.

It would have been easy with larger leisure than ours to have further inquired as to the effect of the two drugs upon the urine, and as to the possibility of their antagonizing one another in that direction. Enough has been done by us, we trust, to show that the question as to the physiological antagonism of atropia and morphia has not as yet been fairly answered.

If we be correct in the views expressed in the foregoing pages, certain practical lessons of some value may be learned from them.

If atropia lessens or destroys the unpleasant influence of morphia on the cerebrum, but does not alter its power to allay pain, there seems to be no reason why we should not use them together so as to obtain all that is best from the morphia with the least amount of after discomfort.

We have certainly had good results from such a use of both drugs, in the form of suppositories, in cases of disease of the bladder or generative organs.

Again, it is sometimes desirable to use either drug in very full doses. This we may do quite fearlessly when assured of our ability to restrain its action by a full exhibition of its opponent.

The foregoing experiments and observations authorize us, we think, to draw the following conclusions as to the use of hypodermic injections, and as to the antagonism of atropia and morphia:—

1. Conia, atropia, and daturia have no power to lessen pain when used subdermally.

2. Morphia thus used is of the utmost value to relieve pain, and is most potent, in certain forms of neuralgia, the nearer it is applied to the seat of the suffering.

3. Morphia lowers the pulse slightly or not at all, atropia usually lowers the pulse a few beats within ten minutes, and then raises it twenty to fifty beats within an hour. The pulse finally falls about the tenth hour below the normal number, and regains its healthy rate within twenty-four hours.

4. Morphia has no power to prevent atropia from thus influencing the pulse, so that, as regards the circulation, they do not counteract one another.

5. During the change of the pulse under atropia, the number of respirations is hardly altered at all.

6. As regards the eye, the two agents in question are mutually antagonistic, but atropia continues to act for a much longer time than morphia.

7. The cerebral symptoms caused by either drug are, to a great extent, capable of being overcome by the other, but owing to the different rates at which they move to affect the system, it is not easy to obtain a perfect balance of effects, and this is made the more difficult from the fact already mentioned, that atropia has the greater duration of toxic activity.

8. The dry mouth of atropia is not made less by the coincident or precedent use of morphia. Atropia does not constipate, and may even relax the bowels; morphia has a reverse tendency.

9. The nausea of morphia is not antagonized or prevented by atropia.

10. Both agents cause dysuria in certain cases, nor is the dysuria occasioned by the one agent relieved by the other.

11. Atropia has no ability to alter or lessen the energy with which morphia acts to diminish sensibility or relieve the pain of neuralgic disease.

12. As regards toxic effects upon the cerebral organs, the two agents are mutually antidotal, but this antagonism does not prevail throughout the whole range of their influence, so that, in some respects, they do not counteract one another, while as concerns one organ, the bladder, both seem to affect it in a similar way.

ART. IX.—*Two Cases of Ovariectomy.* By E. R. PEASLEE, M. D., LL. D.

OVARIOTOMY is no longer, by any means, an uncommon operation; and the following cases are reported mainly from their bearing upon certain questions of great practical moment respecting the manner of performing the operation itself.

CASE I. Mrs. C. A., aged 42 years, married, and a mother eighteen years since, first noticed an enlargement of the right side of the abdomen in August, 1863. This gradually increased till I first saw her, in consultation with Dr. Hubbard, of this city, in October, 1864. At this time her circumference was fifty inches, the lower extremities were very cedematous, the pulse 115, the appetite almost gone, and the strength much prostrated.

I diagnosticated a polycystic ovarian tumour, and advised tapping; both because the tumour was interfering with respiration and digestion, and because I found the patient was then too much prostrated to allow of ovariectomy.

On the 3d of October I tapped her, assisted by Dr. Hubbard, and removed twenty-three pounds of fluid from the principal sac. The œdema of the lower extremities, however, did not disappear, as usual, after the tapping, though the patient's strength and appetite increased somewhat. But the sac rapidly refilled; and though the case afforded much below the average probability of success, I did not feel at liberty to oppose the patient's wish, after informing her of all the risks, that I would give her the only remaining chance of life; and I removed the tumour on the 8th of December, 1864. Present, Drs. Hubbard, J. Foster, Thomas, Conant, and Field, of this city.

I should state here that the weather was very unfavourable for some days before and a week after the operation (incessant rains and fogs); but I did not deem a delay justifiable, on account of her rapidly failing strength.

Operation.—The incision extended from one inch above the symphysis pubis to four inches above the umbilicus, eleven inches in all; as it was found that a shorter incision would not admit of the removal of the tumour after all the larger sacs were evacuated. Some very firm adhesions were found to the left of the umbilicus, and others of slight extent and firmness on its right and in the right iliac fossa. They were all broken down by the introduction of the hand; having been previously detected by passing around the tumour, and between it and the abdominal walls, a polished steel urethral bougie, previously dipped in the artificial serum I am accustomed to use.

A double ligature (three threads of saddlers' silk, waxed, but not twisted) was passed through the pedicle, each half then tied around one-half of the latter, and both cut off close to it, when the tumour was removed. The incision was then closed by seven harelip needles, one inch apart, below the umbilicus, and six silver sutures between them. Above the umbilicus there were six more silver sutures. Thus the incision was closed throughout, the stump of the pedicle remaining *in situ* in the peritoneal cavity. All the needles and sutures included the peritoneum as well as the rest of the abdominal parietes. A compress wet in warm water and covered with oil silk, and a flannel bandage, were applied to the abdomen, and the patient removed to her bed.

The patient died on the seventeenth day after the operation, and the following is a brief *résumé* of her progress in the mean time:—

Was restless and prostrated till 1 A. M., when reaction was fully established, and pulse 118. The excitability somewhat abated at midnight, when gtt. xxx McMunn's elix. opii were given per rectum. Slept about three hours. The enema or an opium pill per rectum was required two or

three times daily during life, and thus regular sleep was usually secured each night. The catheter was used every six hours for six days, the urine being always free and normal. The compress was changed twice every twenty-four hours, and milk-porridge given as nourishment the first five days.

First day after operation. No pain; pulse 116 to 120; skin natural; is very comfortable, and slept well the following night.

Second day. Pulse 116 to 120, and stronger; a little more heat and dryness of the skin; no pain.

Third day. Pulse 112 to 120; has suffered for several hours from colic pains, and there is some tympanites. Introduced rectal tube, and removed the gas; used pil. opii per rectum, to relieve the pain, and had to repeat it twice in twenty-four hours for several days for this purpose.

Fourth day. Pulse 112; had a slight alvine discharge; more tympanites and collection of gas, which was removed as yesterday. Gave brandy $\mathfrak{z}\text{j}$ every two hours. Not much sleep till from four to eight o'clock next morning.

Fifth day. Pulse 102 to 104; quite tympanitic, but gas passed freely through tube. Whine-whey given, since beef-tea and milk-porridge acidify. A good night ensued.

Sixth day. Pulse 102 to 110; much as yesterday; a small alvine discharge this afternoon; exhausted by the pain, and did not sleep much to-night.

Seventh day. Pulse 100 to 112; feels exhausted. An enema of infus. menth. viridis Oij , to remove the gas, succeeded well; when patient slept well, and pulse fell to 98. Bladder more irritable yesterday and to-day, and catheter used every two or three hours. An enema of beef-tea $\mathfrak{z}\text{ij}$ and port wine $\mathfrak{z}\text{ss}$ every four hours.

Eighth day. Pulse 100, and quite strong; less tympanites; countenance better than hitherto. No opiate during this day.

Ninth day. Better every way; pulse 98, and good. Repeated enema of menth. vir. with success. Two alvine discharges to-day, from a laxative given last evening; most comfortable day yet. Port wine $\mathfrak{z}\text{ss}$ and beef-tea every two hours. A good night followed.

Tenth day. Less tympanites; pulse 96 and good; incision had united by first intention throughout, but it is now opened at lower part for half an inch, and $\mathfrak{z}\text{ss}$ fetid pus escaped below the lower pin; it appeared to be caused by a ligature around one of the needles. Brandy substituted for the port wine, and tinct. cinchonæ comp. to be given ($\mathfrak{z}\text{j}$) every three hours. Tympanites not increased; no tenderness of abdomen yet, except as due to the distension; not much sleep to-night.

Eleventh day. Pulse 94, and strong; tympanites much reduced; tongue better (has never been much affected), and she for the first time speaks of having some appetite, and relishes toast and tea; discharge fetid, and about

3ij; erysipelatous redness at lower border of the incision. Pulse 100 and weaker during the evening; more tympanites.

Twelfth day. Pulse 94; tongue somewhat red; erysipelas extends over lower six inches of the incision. Removed all the needles in this part, and applied adhesive straps instead. Discharge fetid (3ij); not much tympanites. Incision looks better this evening; erysipelas not extending; less tympanites. Has taken brandy and beef-tea every two hours.

Thirteenth day. Pulse 96 to 104, and weaker; no appetite; feels depressed, though she slept well last night; tongue better, but still red; erysipelas disappearing, and the discharge is less, but the incision is now laid open *down to* the peritoneum all the way below the umbilicus. To take quiniæ sulph. gr. j every three hours.

Fourteenth day. Pulse 100 to 102, and soft; looks better, and had a good night; tongue redder, and dry in middle; abdomen better in all respects; very little discharge from incision.

Fifteenth day. Pulse 102, and weaker; at 11 o'clock last night vomited a green and intensely acid fluid; also twice afterwards. 1½ P. M. Pulse 112, and weaker; has just got over a *chill* which lasted an hour. 11 P. M. Pulse 120; feels a little dizzy; discharge more fetid again, and edges of incision redder.

Sixteenth day. Pulse 120, and weak; had but little sleep last night, and is very dizzy; a fetid pus discharges (3ss) from lower end of incision and behind symphysis pubis. I inject water and liq. sodæ chlorinat. (Oj to 3iij) into the cavity, and syringe it out thoroughly. 9 P. M. She is much exhausted, and I increase the amount of stimulants.

Seventeenth day. Pulse 122, and weaker; tongue slightly dry and red; can take no food by the mouth; incision beginning to heal throughout; discharge less fetid; no dizziness. She has emaciated rapidly during the last four days, and has had slight tenderness of abdomen during the last forty-eight hours, since the chill before mentioned, and which has not recurred. She is failing, but the brain is unaffected. At 9 P. M. she became dizzy, at 9½ the hearing was lost, and at 10 she died, without a struggle, from mere exhaustion.

Post-mortem eighteen hours after death.—Abdomen very tympanitic. Incision open *down to* the peritoneum throughout its length, except some bands, one-eighth to one-half an inch wide, extending across the spaces between the needles below the umbilicus, and two others above the latter, one inch and half an inch long respectively. The opening at the lower end of incision did not penetrate the peritoneum, but entered an abscess extending behind the left ramus of the pubes.

There was very slight peritonitis, and some exudation into the peritoneal cavity. At the site of the principal adhesion of the tumour was a thick adhesion of the recently exuded plasma.

The pedicle of the tumour was atrophied, but *no slough* had occurred.

The ligature around the largest portion of the stump had nearly slipped off; the other was still *in situ*, and covered by an exudation already somewhat organized. The peritoneum was united everywhere behind the incision, so that the discharge could not enter its cavity when the incision itself reopened. Both kidneys were very much congested, the left most so; and the mucous membrane of the stomach was in an extreme state of softening.

CASE II. Mrs. J. S., of Buffalo, N. Y., 58 years of age, strong constitution, and the mother of two healthy children, first had symptoms about eight years ago which she for several years imputed to "neuralgia." As a tumour of some kind became apparent, she, in June, 1862, consulted Dr. White, of Buffalo, who diagnosticated an ovarian tumour of the right side. During the following year the tumour increased very little; and in June, 1863, she consulted Dr. A. Flint, Sr., of this city, who referred her to me. I first saw her in October following, when, the tumour not having increased during the last four months, I advised non-interference with it till some more urgent symptoms arose. In June, 1864, I found the patient was suffering from the greatly increased amount of fluid in the sac. During the preceding winter there had been considerable œdema of the legs and feet, but it had now nearly disappeared. On the 16th of July I tapped her, and drew off twenty-eight pounds of a clear fluid from a single sac, the abdomen at this time being forty-seven inches in circumference. For three months afterwards she enjoyed good health, and the fluid did not reaccumulate. By the first of March, 1865, she had, however, increased to forty inches, and being in a condition suitable for the operation, I decided to perform it. On the morning of the 7th she took $\bar{3}$ j ol. ricini, which produced a free evacuation of the bowels. Milk-porridge was the only nourishment given for the two days preceding and the three following the operation. The latter was performed on the 9th of March, 1865, in the presence of Drs. Barker, Emmett, Kammerer, Conant, Field, McQuesten, and Janvrin, of this city, and Dr. P. S. Conner, Assist. Surg. U. S. A. The atmosphere of the room was kept moist by the evaporation of boiling water, and at 78° Fahr.; the bladder was evacuated, and sulph. ether administered;¹ and at 2¼ I commenced the operation with an incision in the linea alba four inches long, extending downward from a point one inch below the umbilicus. But very slight hemorrhage occurred, which was controlled by pressure and torsion of two small arteries. The peritoneal cavity was then opened, the incision through the peritoneum being three and a quarter inches in length. I used a large polished steel sound, as in the preceding operation, to ascertain the existence and extent of adhesions, if any; but found there were only some very slight ones above, to the omentum. The sac was then evacuated by tapping, twelve pounds of a

¹ All these preparations were also made in the preceding operation.

heavy albuminous fluid being drawn off; and the sac itself removed through the incision. A very slight hemorrhage occurred from the omentum where the adhesions had been torn away, which was controlled by the application of one silk ligature. The pedicle was treated precisely as in the preceding case. The right ovary was the one diseased, and the empty sac weighed four and a half pounds. Having sponged the edges of the incision thoroughly, and seen that no blood had entered the peritoneal cavity, and that all oozing from the incision had ceased, I closed the latter throughout its length by seven silver sutures, including the peritoneum. Between the silver sutures were also introduced some superficial silk sutures, which brought the edges into perfect coaptation. A wet compress and flannel bandage were then applied, as in the preceding case. The patient having nearly recovered from the effects of the ether, and the pulse being 80 and of good strength, at 4¼ o'clock I gave gtt. xxx McMunn's elix. opii, and the following report shows her subsequent progress:—

Almost constant retching continued for twenty hours (which was ascribed to the ether), during which time ice was taken, and an enema of gtt. xxv McMunn's elix. opii was used. Some nausea continued through the next day. Reaction was fully established by 11 P. M., and the pulse was constantly between 72 and 82 during the whole period of recovery.

The compress was changed every twelve hours till the incision was finally closed, and the catheter was used every six hours for the first three days only. Fifteen drops of McMunn's elix. opii were given every six to eight hours during the first six days, as demanded by restlessness or pain.

The nourishment was milk-porridge till the first alvine discharge was procured (by enema) on the seventh day, then beef-tea, and soon after some solid food. There was no tympanites at any time, and no tenderness, except for four or five days, over the site of the pedicle. The first suture was removed on the seventh day, the last on the fourteenth day after the operation.

The only complications after the retching was overcome were:—

1. The incision, which had united throughout by first intention, on the sixth day began to suppurate, and gradually reopened (by the eleventh day) at two points, each half an inch long, *down to* the peritoneum, but *not through* it. It discharged from ʒij to ʒiij per day until the twentieth day, when it had again perfectly healed. She was not allowed to sit up till then, though strong enough for several days before.

2. A dysenteric attack occurred on the thirteenth day, which was, however, overcome by the use of hydrarg. protochlorid. cum rheo.

After the twenty-first day the patient sat up all day; and one week thereafter left the city to visit her friends.

Remarks.—1. The first of the preceding cases was a very unfavourable one for ovariectomy. A great depression of the vital powers was shown

from the fact that the œdema of the extremities was not removed after the first tapping. After the operation, also, a slough formed around each of the needles, and in contact with each ligature, used in closing the incision. Besides, she had had little appetite for several months, for which the state of the gastric mucous membrane may account; and her age (40 to 45) is the most unfavourable of all.¹ On the contrary, the other patient was very fortunate in this respect (over 50 years), and also in most others.

2. But both cases illustrate the importance of including *the peritoneum* by the sutures (and needles) used to close the incision. Both incisions were opened by suppuration down to the peritoneum; but the matter in neither case entered the peritoneal cavity, as it must have done, had not the peritoneum been united during the suppuration in the incision. In the second instance the incision reopened without any apparent cause.

3. The first case also demonstrates the position I have assumed² respecting the effect of a ligature upon the pedicle, viz., that *no slough of the stump of the pedicle is thus produced*, and that the method of treating the pedicle adopted in these two cases promises the best results.

FIFTH AVENUE HOTEL, NEW YORK, May, 1865.

ART. X.—*Congenital and Hereditary Malposition of the Patellæ.*

By EDWARD T. CASWELL, M. D. (With a wood-cut.)

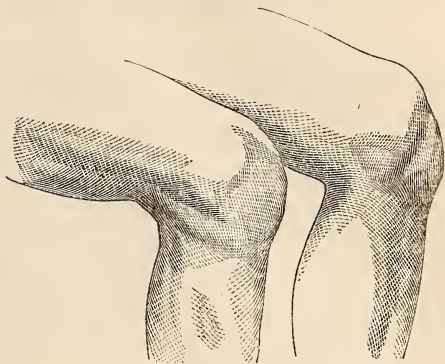
THE following case is of such great rarity that a brief notice of it seems to deserve a place in the records of our profession. Having communicated the facts here presented to some of the most celebrated anatomists and scholars in our profession, gentlemen of wide research and of extensive observation, I learn that neither in their own experience nor in their reading have they met with an analogous case. It is remarkable in itself, and still more so for the hereditary character which it bears.

E. S., aged 43 years, of apparently sound health and good constitution, appeared before me while I was acting as assistant surgeon of enrolment, and claimed exemption from military duty on the ground of "having no knee-pans." Upon examination I found the appearance presented in the accompanying cut. As he sat with the knees bent, the absence of the patellæ from their proper place was very manifest, the surface of the knee forming an inclined plane. The whole edge of the femur, and the edge of the tibia, were distinctly visible beneath the integument, and my finger could be laid upon the head of the tibia without difficulty. The condyles

¹ See my statistics in this Journal, January number, 1865, p. 100.

² See my paper on Ovariectomy, Trans. of N. Y. Acad. of Med., vol. 3, part 3.

of the femur, and especially the internal, seemed much enlarged, and for a moment I thought the patellæ were wanting, but upon a closer examination I found that they were placed above the external condyles of the femur on each leg. The left patella was very much smaller than usual, and was very freely movable. The man stated that in his youth he could almost bring it into its proper place. The right patella was somewhat larger than usual, and was much less movable, considerable force being necessary to carry it one-



third of the distance towards the middle line. The tendon of the quadriceps on each side preserved its normal relation to the patella, and had consequently an outward direction; the ligamentum patellæ was well pronounced upon the right leg, but on the left it was barely perceptible. The legs were quite shrivelled both above and below the knee.

In addition to his labour as an operative, S. cultivated a small farm. He has always enjoyed good health, and has no apparent tendency to scrofula or any hereditary disease. The malformation inconveniences him only in two ways. He cannot descend a flight of stairs nor walk down hill without exercising great caution, nor can he carry any weight while descending. A burden which he can carry without inconvenience in ascending, he finds it impossible to bring down. The explanation is obvious, and his experience is what one would naturally expect from the existing condition.

He tells me that his father, his sister, his son, and the son of his half-brother by the same father, have all the same malformation. I have every reason to place confidence in his statement. I examined his son, who is about six years of age, and found the same malformation as in the case of the father, but not so well marked. The latter says that his own deformity was less manifest when he was a boy than it now is. Several of my medical friends have seen this curious case, and can substantiate the statements I have made. If a similar deformity has fallen under the notice of other surgeons, it is to be hoped that the profession at large will have the benefit of such observations.

PROVIDENCE, R. I., March 1st, 1865.

ART. XI.—*Excision of Head of Humerus.* By EDWARD R. FELL, M. D.,
Acting Assist. Surgeon U. S. Army.

CASE I. Jesse Hughes, corporal, 1st Pennsylvania Cavalry; aged 25; farmer prior to enlistment; general health good. Wounded in battle for possession of Weldon Railroad, August 23, 1864; conical ball struck the arm anteriorly, just below the shoulder, and passed out at posterior border of axilla. Admitted to Mower General Hospital, August 29; complained but little, and was in fair condition. Wound did well under simple dressings until September 3, when there were indications of sloughing. Patient was chloroformed, edges of wound incised, and a thorough examination of the injury instituted. A longitudinal fracture of humerus was found to exist (and which it was presumed extended into the joint), extending for about two inches down the continuity of the bone, necessitating excision of head of humerus. It was decided to get the soft parts into a healthy condition before operating. Dressings of solution of permanganate of potassa soon effected this, but the patient seemed to be losing strength. On the 5th excision was decided upon. A flap after the manner of Morel was made across the deltoid, and from the lower edge of the flap an incision of two inches in length; the bone was divided as low down as the fracture extended, after the head had been disarticulated in the usual manner. He rallied and did well, and until the 19th everything was encouraging. On that day he had a chill, soon followed by others. Declining rapidly, he died on the 27th, with all the symptoms of pyæmia. No *post-mortem*. An examination of the bone removed at time of operation showed the fracture to extend as far as the centre of the head of the humerus.

CASE II. J. M. Eckelberger, private 4th Pennsylvania Cavalry; aged 20; labourer prior to enlistment. Wounded at battle of Deep Bottom, Va., August 16, 1864. Admitted to hospital August 29. General health of patient good. Conical ball struck the arm anteriorly, shattering, without fracturing, the humerus one inch below surgical neck. Considerable necrosis soon occurred. Wound treated with simple dressings, and stimulants administered. On the 6th of September a large abscess which formed in the posterior portion of arm was opened; considerable hemorrhage followed, which was arrested by compression. By the 10th the wound commenced sloughing; dressings of solution of permanganate of potassa used. On the 18th secondary hemorrhage from branch of posterior circumflex. A thorough examination was now instituted. Pus had burrowed into the shoulder-joint, and four inches of shaft of humerus was denuded. Patient chloroformed, and excision performed by making an incision from top of shoulder, along posterior border of deltoid, passing through the wound of exit; head disarticulated and removed, with three and a half inches of

shaft. There was very little hemorrhage, and reaction from anæsthesia was prompt. Dry dressings were used for the first few days, after which stimulating dressings were required. Under generous diet and stimulants the man made a good recovery.

CASE III. John Welch, private, 61st New York Infantry; aged 22. Admitted July 22, 1864. Wounded during battle of Wilderness, Va., May 5. Conical ball entered front of left shoulder, two inches below summit; passing through head of humerus, made its exit at outer side, and below spine of scapula. General health of patient good.

July 30. Shoulder more painful than usual; abscess forming; opened August 5, evacuating a large amount of offensive pus.

August 7. Feels better, and rests well at night.

15th. Another abscess forming; subsequently discharged through orifice of entrance of the ball.

27th. Head of humerus and two inches of shaft removed through an incision five inches in length through posterior border of deltoid. Some branches of posterior circumflex required ligation. Dry dressings used. Under tonics and stimulants the man made a good recovery. During convalescence abscesses formed just beneath the clavicle, and also over the scapula.

CASE IV. Lawrence Turner, private, Co. A, 5th Pennsylvania Cavalry; aged 30. Admitted to hospital June 21, 1864. Wounded June 15, in battle before Petersburg. Conical ball struck the arm four inches below shoulder, at posterior border of deltoid, and passed out on inner surface of arm, comminuting extensively the humerus.

June 22. Wound discharging profusely; angular splint applied.

July 1. Patient getting so much weaker that, after consultation, excision was decided upon. A slightly curved incision six inches in length was made, commencing just below the acromion, passing through the original wound of entrance and slightly towards the anterior border of deltoid. Removed the head and five inches of the shaft of humerus. Wound partially closed by sutures and adhesive strips. Reaction following anæsthesia was prompt.

2d. He was placed on a water bed. Tonics and stimulants used freely.

4th. Pus burrowing in axilla, for which a compress was used.

5th. Patient cheerful; appetite good; slight diarrhœa, controlled by opiate injections; wound suppurating profusely.

6th. Diarrhœa troublesome. Large quantities of beef-essence and milk-punch are being administered.

7th, 8th, and 9th. Diarrhœa controllable; night-sweats; pulse 102 and feeble; suppuration profuse.

13th. Unable to retain nourishment.

Died on the 14th, of exhaustion.

Dr. W. P. Moon, Executive Officer, was the operator in the four cases which are here cited. He expresses a decided preference for an incision along the posterior border of the deltoid in performing these incisions, presenting the following advantages:—

1. Greater facility in removing the head of the humerus, from the fact that by making an incision through the centre of the deltoid, this muscle acts as a clamp when the elbow is depressed backwards to push out the head, and thus interferes with the operation.

Owing to the risk of injury to vessels and nerves in excision of the head of the humerus, the chain saw has not been used.

2. Greater facility for the evacuation of the discharges; as it has been found, as in the cases of Hughes and Turner, and several others which have been received at this hospital from the field, that, where an anterior incision was made, it was nearly impossible to prevent the pus from burrowing and forming abscesses in the axilla and arm, hindering the healing process and endangering extended necrosis of humerus.

3. A more rapid cure, patients recovering in from three to four months instead of six to eight months.

4. Greater rotundity of the shoulder, from less atrophy of muscular structure, and consequently more strength of the arm.

PHILADELPHIA, March 24, 1865.

ART. XII. — *Gunshot Wound of Mouth and Face—Ball lodging in Esophagus, and subsequently ejected by vomiting.* Reported by DEWITT C. PETERS, Asst. Surg. U. S. A., and Surgeon in Charge of the Jarvis General Hospital, Baltimore, Md.

THOMAS DEERKIN, private Co. H, 107th Penn., age 48, was admitted into Jarvis General Hospital, Feb. 11, 1865, with a gunshot wound of the face and mouth, received at Hatcher's Run, Va., Feb. 6, 1865. The ball, a minie, had struck the tuberosity of the left malar bone, passed backwards, inwards, and slightly downwards, entered the cavity of the mouth. The patient was under the impression that it fell immediately into the gullet and was swallowed.

On admission, the patient's general condition was very good, and he was able to walk about the ward, but he complained of a sense of uneasiness about the precordial region and great difficulty and pain in swallowing, which he stated he had experienced since he received the injury, although his diet had been confined exclusively to liquid nourishments. On the afternoon of Feb'y 16th, in an effort to vomit, which came on suddenly, he ejected a minie ball, and found himself at once relieved of all feelings of

uneasiness and able to swallow without either difficulty or pain. The ball was somewhat flattened and of irregular shape, and had probably lodged in the œsophagus. This patient was transferred to York, Pa., March 11, 1865. At that time the wound had about healed, and he was to all appearances perfectly well.

ART. XIII.—*Therapeutic Effects of the Iodide of Sodium.* By JOHN J. BLACK, M. D., one of the Resident Physicians to the Philadelphia Hospital, Blockley.

AT the suggestion of Professor Gross, this remedy was used in a great measure as a substitute for the iodide of potassium in the venereal wards of the Philadelphia Hospital, Blockley, during the past winter. The dose given ranged from six to ten grains, and most frequently in combination with from one-tenth to one-sixteenth of a grain of the bichloride of mercury three times a day. When giving it alone we generally preferred the following prescription:—

R.—Sodii iodidi, ʒj; aquæ cinnamomi, fʒj. M.

Twenty-five drops of the above equal about six grains of the iodide of sodium. This form renders the remedy more portable and convenient.

Altogether it was used in forty-eight cases, and in every one the improvement was prompt, marked, and decided. In no instance were the functions of the stomach seriously disturbed, but now and then a patient complained of slight griping pains in the bowels; but these cases were all using the medicine in combination with the bichloride of mercury. None of the patients complained of fulness about the head, dryness of the throat, or coryza. Indeed we are free to say that none of the unpleasant symptoms often attendant upon the administration of the iodide of potassium presented themselves in any of the cases treated. As to its efficacy, it appeared fully to deserve all the encomiums so freely bestowed upon the potassium. Cases as nearly alike as possible were placed, one on the sodium, and one on potassium, and there was no perceptible difference in the progress of each. We believe the two iodides here mentioned to be equally efficient, neither one surpassing the other in results; but we are inclined to think that in a patient in whom the digestive powers are easily disturbed, the iodide of sodium is the remedy to be preferred, and we have no doubt but that it will soon come into general use in this country. I have been informed that the iodide of ammonium, at the suggestion of Professor Gross, has also been freely used in this house, and that the results obtained were most satisfactory. Personally, I have had but little experience with this remedy.

ART. XIV.—*Cystic Encephaloma of the Ovary.* By JOS. G. RICHARDSON, M. D., Union Springs, Cayuga Co., N. Y., late Resident Physician to the Pennsylvania Hospital, Philadelphia.

OVARIAN disease in all its forms, and ovariectomy, have of late years occupied so large a share of the attention of the medical public, that the following notes in relation to a somewhat unusual example of the affection may perhaps excite some interest, detailing, as they do, the rare and fortunate termination by spontaneous rupture of the cyst, within two months of its occurrence.

On the 24th of December, 1864, I was called to visit Mrs. C., a widow lady aged 56, who was suffering severe pain, which she referred to the left side of the abdomen. In that region a decided protuberance was perceptible, of which she gave the following account: Three months ago she first noticed a "bunch" in her left side, low down towards the groin, after running to catch the steamboat, but she suffered no pain in it until about one week since, though it constantly increased in size; for more than a year she had felt inclined to favour that side when turning in bed, &c. She also stated that her husband died about fourteen months since, and that she ceased to menstruate five years ago, but that she has had two or three times within the past three months discharges, about a month apart, similar to the catamenia, but less abundant; during the last year she has lost strength and about fifty pounds in weight, though still by no means emaciated. Her tongue was slightly furred, skin icterode, pulse a little accelerated, bowels inclined to be costive, and urine scanty and high coloured. There was a tumour in the left lumbar region, pressing up the stomach and intestines, reaching down into the pelvis, and nodulated in the left iliac fossa. This tumour was the seat of pain, which was very severe on attempting to rise, turn, or move the left limb, and the tumour was exceedingly sensitive at a point about two inches above and to the left of the umbilicus, though not elsewhere. Examined per vaginam, the os uteri was found normal, but the womb itself was anteverted by a firm rounded tumour pressing forward the posterior wall of the vagina; the same rounded mass was perceptible on examination per rectum, compressing the gut tightly against the sacrum. Under the employment of antiphlogistic and anodyne applications the pain was soon relieved, and in a short time quite disappeared.

During the next few weeks she was seen and examined by several physicians in consultation, one of whom felt satisfied that it was an inflammation of the peritoneum, investing the uterus and ovaries; another, who has practised in this county for nearly fifty years, insisted that it was an enlarged spleen, and nothing else; while a third, who did not see her, after a minute inquiry into the symptoms, decided it was a uterine growth. It appeared, however, that the size and painless course of the tumour rendered *pelvic cellulitis* improbable; while the normal length of the cavity of the womb, as ascertained by Simpson's uterine sound, and the lateral origin of the tumour, negatived the hypothesis of *uterine disease*. In regard to *enlargement of the spleen*, although she had suffered from intermittent, yet by careful percussion I was able to mark out that organ in its normal posi-

tion, and the microscope afforded additional evidence by proving the absence of leucocythemia, the relative number of the white and red corpuscles being found, on examination, to retain its natural proportion. By these considerations, and in view of the rapid growth of the tumour, its bossilated character, and the patient's loss of flesh and strength, I was led to the diagnosis of ovarian dropsy, probably originating in carcinomatous disease, and in this opinion Dr. Briggs, of Auburn, the eminent surgeon of this county, fully coincided, after a careful examination.

From the time when I first saw her, when the abdomen measured about thirty-two inches over the crista ilii, the tumour gradually and steadily increased, in spite of various diuretics and alteratives employed at the suggestion of consulting practitioners, until the 6th of February, 1865, when she reached a circumference of thirty-eight inches and a half. On that day her abdomen was softer, and the fluctuation of fluid very distinct; she stated she had felt for a day or two as if something was giving way; in the evening it appeared to her that the tumour burst suddenly, causing her to "feel all gone," as if about to faint; the following morning she passed nearly a quart of pale, light-coloured urine, and during the day micturated six or seven times, about a pint on each occasion, the swelling of the abdomen decreasing almost hourly. On the 14th of February she was so much improved as to ride about a mile down to the village and spend some time with a married daughter, at whose house I examined her, and found that the tumour had almost disappeared, except what felt like a narrow strip of solid substance, situated nearly vertically in the abdomen, in contact with and moulded to the left lateral wall of that cavity; the rest of the belly was soft and flaccid, and, when percussed, yielded the normal clear sound over most of its area.

For about a month from this date I did not see her, but understood that her health constantly improved, and that she considered herself rapidly recovering, although I entertained and expressed to her family but little hope of so fortunate a result. Soon after I learned that she had again commenced to enlarge, and had employed an Indian doctress, who boasted numerous cures of dropsy, and promised to relieve her entirely of her difficulty. When asked where the water was, this old woman told them "it was in the mother," and proceeded to administer various drastic cathartics, among which I subsequently recognized gamboge and aloes; she continued to take those medicines until the 23d of April, when she found, on awaking, that her left leg was discoloured, swollen, and somewhat painful, and the next day, becoming alarmed lest it should mortify, requested my attendance. On entering the room, I was struck by the great emaciation which had occurred, as well as by the extreme debility marked upon her countenance, which, however, were doubtless far less the ravages of disease than the direct results of the violent and prolonged catharsis to which she had been subjected, assisted by her inability to retain food in the irritated stomach. Her symptoms were relieved by appropriate treatment; but the ventral enlargement continuing to increase, on the 28th of April I examined her, in consultation with Dr. Robinson, with a view to decide upon the propriety of paracentesis, and perform the operation if advisable. We found the abdomen measuring about thirty-eight inches at the umbilicus, quite tense, and dull on percussion, the intestines, &c., being pushed upward to the margin of the thorax; fluctuation on the right side was very distinct, but terminated abruptly about two inches to the left of the linea alba, where the hard, firm, nodulated tumour so plainly observable two months before

was very obvious. This mass had apparently doubled its size, was much nearer the median line, and had risen higher in the abdominal cavity. Her respiration was rather laboured; tongue furred; pulse quite weak, and about 100 per minute; but she felt somewhat easier than the night before, and being buoyed up by the hope of another rupture and discharge of the fluid, she desired that the tapping should be postponed a little longer.

On the evening of the day following I was hurriedly called to her bedside, the messenger informing me that she seemed to be dying, and that they wished me to come up and tap her, if it would give any relief. I found her very feeble, with a rapid pulse, occasionally fluttering a little, extremities cold, and respiration hurried and laborious. The unfavourable prospect of any surgical proceeding under the circumstances was explained to the relatives; but it being obvious that she could not continue long in this state the operation was chosen as affording a chance of recovery, and it being then almost midnight I proceeded alone in its performance—the trocar was entered in the linea alba, about two inches below the umbilicus, and nearly sixteen pints of clear yellow serum drawn off; finding the pulse becoming more feeble the canula was withdrawn, and the wound closed with a compress and strips of adhesive plaster. Though her breathing became less and less laborious as the fluid escaped, she complained of feeling so faint that I administered a small quantity of milk punch with a little aromatic spirit of ammonia; this, however, was very soon rejected, and she totally refused to swallow anything else. In spite of sinapisms and other external stimulants, she gradually sank, and died about two hours after the operation.

Autopsy, held May 3d, at 9 A. M., 80 hours after death. Present, Doctors Thompson, Robinson, and Hurd.—Rigor mortis moderate; face and upper extremities much emaciated, but considerable adipose tissue still remaining about the abdomen and lower limbs. An incision was made through the integuments, to the left of the linea alba, about six inches in length, which was afterwards enlarged, until it extended from the mons veneris to the ensiform cartilage, reaching the peritoneum. That membrane was punctured and slit up on a grooved director. Turning back the margins of the incision, the irregular nodulated tumour so distinctly felt from the outside was exposed to view, presenting a smooth and shining appearance, in some parts of a silvery white, in others a dark bluish colour. The cavity of the peritoneum contained about six pints of serum, of a pale yellowish tinge, similar to that drawn off during life. This was carefully sponged out, and the mass was discovered to be adherent to the anterior wall of the abdomen, over a space of some two inches in diameter at the precise spot where the patient complained of such severe pain when first seen by me. These adhesions were easily separated by the fingers, and slight attachments to the jejunum and sigmoid flexure were also very readily ruptured; no adhesions existed within the cavity of the pelvis. Drawing the growth upward and outward, it was at once obvious that it proceeded from the left ovary; and in order to obtain a more complete view the broad ligaments and vagina were divided, and the whole diseased mass with the uterus and right ovary, the latter also somewhat affected, was removed.

The tumour was of a very irregular outline, approaching perhaps most nearly to the form of a sphere about seven inches across, flattened from before backward to a diameter of about five inches; on the right side was an irregular rent nearly four inches long, presenting the appearance of hav-

ing been forcibly torn, and opening into a non-flaccid cyst. The edges of this fissure were rounded and non-vascular, and in the opinion of those present were imperfectly cicatrized. The walls of the cyst were about one-sixteenth of an inch in thickness, firm and tough, and apparently condensed from a thinner membrane. Its capacity was estimated at about three pints. The middle third of the growth was of different degrees of solidity, varying from a soft brain-like pulp to an almost cartilaginous hardness; in some portions ulceration seemed to have been set up, while in others cysts ranging in size from a small shot to a marble, were imbedded in more or less firm stromata. On the left side were two cysts, which, though compressed together by their common peritoneal envelope, were separated by a complete septum. The upper one was filled with a chocolate-coloured fluid, while the lower contained a yellow serum, each cavity holding about half a pint. One of these appeared to be multiplying by endogenous growth, its inner surface near the base being studded with a multitude of small cysts, varying from a large pea to a mustard seed in magnitude. The right ovary was enlarged to the size of a hen's egg, and contained two or three small cysts filled with fluid; the solid portion was of a moderately firm consistence, darker in colour and more vascular than the diseased mass on the opposite side.

The uterus was normal in bulk and texture, but on incision proved to be a good deal congested, and its lining membrane injected of a deep red colour.

In the fold of the broad ligaments on each side of the horns of the uterus was a small conglomerated mass of spherical bodies, not unlike in size and shape to a bunch of currants. The larger ones appeared to be quite ossified, but on section proved to consist of a bony shell filled with a brownish semi-solid substance.

The peritoneum was somewhat reddened, and rather more vascular than in health, but exhibited no patches of effused lymph.

The spleen was perfectly natural in size, and sensible characteristics, and occupied its usual position under the ninth rib.

Kidneys normal in seat, colour, and texture.

Liver, gall-bladder, and intestine presented an entirely healthy appearance.

On microscopical examination of some portions removed from the tumour, the cerebriform pulp was found to exhibit in remarkable abundance the characteristic irregular cells with large nuclei of carcinoma, while the harder parts, though containing numerous indistinct caudate cells, were yet in some places quite fibrous in structure, corresponding perhaps most nearly to the alveolar cancer of recent pathologists. These hardest nodules were pronounced by some of the gentlemen present at the autopsy, scirrhus formations, which, however, Prof. Rokitsky states to occur very rarely in the ovary.

Reviewing this case in the light afforded by the post-mortem examination, it would appear that the pain she was suffering on my first visit was due, as was then inferred, to a local attack of peritonitis, which resulted in the formation of adhesions to the anterior wall of the abdomen, and, that inflammation being subdued, the tumour proceeded in an almost painless course for about six weeks, when the largest cyst did actually, as she supposed, rupture into the cavity of the peritoneum, and its contents being in

great measure absorbed by the peritoneal membrane were discharged through the kidneys. Accompanying the accident only a slight faintness was observable without actual syncope, pain, inflammation, or febrile excitement; and so great was the relief experienced by the patient that there is little doubt that its occurrence, fortunate as it seemed at first, was in reality the means of at least abbreviating her existence, inducing her, as it did, not only to refuse the operation of ovariectomy which I proposed to her, but also the palliative proceeding of paracentesis, until too late to be of service. It would likewise seem probable that the cyst after its rupture gradually contracted, continuing to secrete fluid, which on account of the absorbent power of the peritoneum failing (from its surface becoming irritated, and its circulation interfered with by the increasing pressure of the tumour with its secondary cysts), gradually accumulated in the abdominal cavity and gave rise to the dyspnoea and other painful symptoms, which finally forced her to seek relief from a surgical imitation of Nature's former cure, performed, alas, without Nature's original success.

In regard to the excision of the tumour or rather tumours, for the removal of both ovaria would, of course, have been necessary, although the demonstration of cancer cells in the solid portion would throw some doubt on the probable permanency of the cure by successful operation; yet the slight character of the adhesions, the size of the principal growth rendering extraction through the small incision after puncturing the cysts feasible, the slenderness of the pedicle, and especially the previous good health and vigorous constitution of the patient, both of whom are now living at the advanced age of ninety years and upwards, must, I think, place this in the category of cases in which ovariectomy would probably have been accompanied with success.

TRANSACTIONS OF SOCIETIES.

ART. XV.—*Summary of the Transactions of the College of Physicians of Philadelphia.*

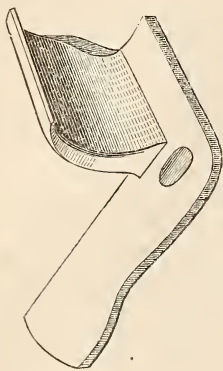
1864. June 1. *Spotted Fever*.—Dr. D. GILBERT said that among the cases reported by him to the college, at the meeting in March last, there was one of a boy, aged seven years (see number of this Journal for July, 1864, p. 141), who was attacked about three weeks previously, and had progressed favourably under the use of large doses of quinia and stimulants. This case continued to do well, and about the 1st of April became convalescent, so that on the 10th he ceased attending him. He was again summoned on the evening of the 20th of April, when he found the patient totally insensible, with pupils dilated, pulse small and frequent, &c. On inquiry he learned that the boy had not had any alvine evacuation for the last three or four days, and that on that day he had eaten an unusually large quantity of indigestible food. Everything possible was done to relieve the brain, procure discharges from the alimentary canal, and sustain the system, but in vain. He died on the next morning. Dr. G. stated that on the 6th of March last he was called to another well characterized case of this peculiar disease, in the person of a lady, aged about twenty-five years, residing in Stiles Street. The eruption appeared on the second day. Without entering into a full account of the case, he said that his object was merely to bring it before the college as additional proof of the value of quinia in large doses in the treatment of this malady. He gave this patient four grains every hour until 3j was taken, then the same quantity every two hours for a day or two, and finally every four hours, keeping her thus fully cinchonized until after the tenth day, when convalescence commenced. This patient recovered fully in about three weeks. Dr. Stillé saw the case, at Dr. G.'s request, on the fifth day.

Oct. 5. Splint for Fractures of the Lower part of the Humerus.

Dr. PACKARD exhibited a splint employed by him with advantage in cases of fracture of the humerus, especially when the lesion is seated at or below the middle of the bone.

For many years it was the custom in this city to use the external and internal angular splints devised by Dr. Physick for cases of this kind. Not very long ago, however, there was substituted for these (by whom I have been unable to ascertain) a single angular splint, hollowed out so as to fit the anterior surface of the arm, forearm, and hand; the hand being of course kept in a state of supination. In many cases this splint answered an excellent purpose, especially when there was used in addition to it a posterior pasteboard case for the lower part of the arm. But the supine position of the hand is not comfortable when long kept up, and the want of lateral support at the seat of injury sometimes gave rise to angular deformity.

It therefore occurred to me to add to the inside angular splint a piece shaped like the arm-part of the anterior angular splint, and this is the simple principle of the splint I now exhibit. The thick inner edge of the hollowed anterior part is fastened by nails to the edge of the upper portion of the inside splint. Its lower edge is carefully cut away, rounded, and smoothed to fit across the bend of the elbow. Its upper edge is pared down internally so as to form with that of the inside splint a line corresponding to the shape of the anterior wall of the axilla. It is upon the correctness of these lines above and below that the accuracy of the fit of the whole splint depends, and hence also its comfort and efficiency.



The annexed sketch will serve to illustrate still further the explanation now given, although the part for the anterior face of the arm is represented very much too wide. I am in the habit of having the splint made upon a rather large measurement, cutting it down to fit each special case. Several times I have had it made by carpenters entirely unused to splint making, but have had no difficulty in giving them the idea.

The patient's comfort is further promoted by cutting away the under edge of the forearm part of the splint so as to allow the hand to be somewhat abducted, as in Bond's splint. The hollow at *c* for the inner condyle is important in this as in all the other internal angular splints. Should the condyle be very prominent, or the arm very thin, it is better to make a hole here, rounding its edges very carefully.

Dec. 7. Death from Hemorrhage caused by a Sharp Sequestrum cutting the Popliteal Artery. Dr. HUNT reported the following case :—

J. P., aged 19, was admitted to the Pennsylvania Hospital Nov. 9, 1864, after an alarming hemorrhage, which came through sinuses communicating with dead bone in the popliteal space. His countenance was pale and anxious, pulse frequent, quick, and small, tongue glazed, dry, and aphthous, respiration hurried, bowels costive, and abdomen meteoric. He had slight delirium at night, and constant jactitation. Old sinuses and cicatrices pointed to necrosis, the origin of which was uncertain, but was supposed to have been first caused by a fall on the ice in the winter of 1861–2. As there was no bleeding at the time of admission, the full extent of the necrosis was not ascertained, as a thorough exploration would have endangered a return of the hemorrhage. Perfect rest, nourishing food, persulphate of iron, and chlorate of potash were prescribed. A bandage was applied to the limb, which had become cedematous, and it was also elevated. At this time slight pulsation could be detected in the tibial arteries. On consultation it was determined that if the hemorrhage returned to etherize the patient, open the wound, and amputate or ligate, according to the results of the exploration. The patient's comfort was greatly improved, but his general condition cannot be said to have responded to the treatment. The condition of hydræmia into which he was thrown from the great loss of blood before entering the hospital, gave very poor hopes of recovery.

A drop of his blood on a glass slide, spread over a much greater space and coagulated in much wider meshes than healthy blood.

Under the microscope there was a marked diminution of red and an increase of white corpuseles. On Sunday, Nov. 20th, an alarming hemorrhage commenced, but it was promptly checked by compresses and the tourniquet. From this time pulsation in the tibial vessels entirely ceased. The patient was so weak as to forbid operation when the attending surgeon arrived.

On Tuesday following, about three ounces of blood were lost, after which the patient gradually sank and died on Wednesday night. The whole amount of blood lost, while in the hospital, did not exceed six or eight fluid ounces.

Autopsy—No examination of the viscera permitted. The connective tissue around the wound was infiltrated with serum and lymph. The muscular interspaces were filled with decomposing blood, and broken down tissues, including those of the nerves and bloodvessels, which were involved in the general pulpy mass. An external sinus communicated directly with the femur, which was partly denuded, and on the posterior surface of which was a large cloaca with thickened and rounded edges; from this there projected inwards and downwards a very sharp *movable sequestrum*, which was three inches in length, and which compressed and finally cut across the main artery directly after its passage through the great adductor tendon. The medullary cavity was obliterated for the space of two inches above the seat of disease. The specimen is in the museum of the College of Physicians.

On the Use of the Sulphite of Soda in the Treatment of Erysipelas.

Dr. ADDINELL HEWSON stated that he had been using the solution of sulphite of soda as a local application in erysipelas since February, 1864, and had obtained results from it in the various forms of that disease which were to him both interesting and surprising. He had been induced to try it from the representations made by Prof. Polli of its influence in destroying all disease of a cryptogamic or animalcular origin—a source to which recent researches would lead us to suppose erysipelas was due. At first he administered it internally, in doses of ten grains every two hours, as well as applied it locally, but the effects of the local use were so prompt and decided that he has now abandoned its internal use altogether as unnecessary. In extensive trials of this remedy, both in hospital and private practice, he has never seen it fail when thoroughly applied before the deep planes of cellular tissue had been invaded by the disease. Under the latter circumstance no positive curative results were of course to be expected from its mere external use. But before such parts had become affected a solution of ten grains of this salt to the ounce of water when thoroughly applied on lint all over the surface affected and to a considerable distance beyond it and covered with oiled silk to prevent the evaporation of the solution, had not only produced a decided bleaching effect on the discoloured surface in every such instance in the first twenty-four hours of its use, but had invariably destroyed all traces of the disease in forty-eight hours from its first application. The result was the same whether the application was made in the traumatic or idiopathic form of the disease. He had thus cured twenty-seven cases, seven of which were of idiopathic erysipelas. Even in the cases where the deep planes of cellular tissue were involved as well as the surface, the disease on the surface was always apparently affected by the application. It was most positively bleached in all instances, and in

many was evidently destroyed, within the period above stated, even whilst that in the deeper parts proceeded on steadily to suppuration.

1865. *Feb. 1. Two Cases of Aneurism.*—Dr. JOHN ASHHURST, Jr., communicated the following account of two cases of aneurism.

CASE I. *Popliteal aneurism; deligation of femoral artery; recovery.*—Joseph Fleming, private Co. C, 157th Regt. Penna. Vols., was admitted to the Cuyler U. S. A. Hospital at Germantown, on June 6th, 1864, having been transferred from St. Paul's Church Hospital, Alexandria, Va. Upon examination I found him to be suffering from a well-marked aneurism of the popliteal artery of the right side. The tumour was about the size of a duck's egg, the pulsation being strong and diffused over the whole tumour, the *bruit* loud, but the thrill not very well defined. He kept his leg in a semiflexed position, and complained of constant pain, referred to the tumour and to the ankle of the same side. The limb below the aneurism was somewhat cedematous, dusky, and pitting slightly on pressure.

He stated that he had first observed the tumour some months previously (he could not fix the exact date) after severe exertion in lifting heavy stones. The tumour had gradually though slowly increased in size, and the pain in his limb had latterly become more intense. The only treatment to which he had been subjected before his admission to Cuyler Hospital, was, according to his own statement, the application of an ointment, and of a liquid which from his description appears to have been the tincture of iodine.

There seemed to be no disposition to disease of the arteries in any other part of the body, and physical examination showed the heart to be perfectly healthy.

Bearing in mind Mr. Syme's case in which coagulation and a spontaneous cure were effected by the simple application of a bandage to the limb, this plan was tried, the patient being strictly confined to his bed. No success following this method, forced flexion was next employed, the leg being bent upon the thigh and firmly fixed by numerous turns of a "figure of eight" bandage. This mode of treatment likewise proving unavailing, pressure by means of an instrument resembling Signorini's tourniquet was resorted to, but was found equally ineffective with the means previously employed.

The aneurism in the mean while was steadily enlarging, and the risk of venous obstruction becoming daily more imminent. I therefore resolved to tie the femoral artery at the lower angle of Scarpa's space, which was accordingly done in the usual manner on June 16th, 1864. Anæsthesia was induced by the use of ether, and the vessel reached by an incision about three inches in length. The hemorrhage during the operation scarcely exceeded a fluidrachm. The pulsation in the tumour ceased instantly upon the tightening of the ligature. The edges of the wound were then brought together by hare-lip pins and several points of the interrupted suture (lead wire being the material employed) and lightly dressed with a dry dressing of sheet lint. The entire limb below the wound was at the same time enveloped in carded cotton. The temperature of the affected limb was at first slightly above that of the opposite side, but soon became normal and so remained. When the state of anæsthesia passed off the patient complained of a burning pain in the heel and ankle, which, however, soon disappeared.

The tumour in a few hours became hard (showing that a clot had formed), and gradually diminished in size, there not being at any time recurrent pulsation. The wound healed almost throughout by adhesion, the ligature

dropping on the seventeenth day, and the progress of the patient to recovery being uninterrupted. The application of cotton to the limb was discontinued after the fifth day. On September the first the wound was entirely healed; a firm tumour was still perceptible in the popliteal space; there was no pulsation to be felt in the tibial arteries.

In reviewing any successful case of an operation so serious as to its prognosis as ligature of the femoral artery, it is important to discover, if possible, whether the successful issue be attributable to any peculiarity in the operation itself, or in the after treatment of the patient. The average mortality after this operation is quite one in three; rather more therefore than after amputation of the thigh. And the statistics of the operation show that its fatal result has in most instances been due to gangrene of the limb below the wound. The prevailing idea in the profession is that the gangrene is due to the interrupted arterial supply, and hence the great anxiety felt that the collateral circulation should be established.

But this idea in the case of aneurism is erroneous, as has been shown among others by Porter in his valuable monograph. In these cases the risk of gangrene is from pressure on the venous trunks from the coagulation of the blood in the tumour itself. And this is one reason why in many situations the "old operation," or that of Antyllus is better than the Hunterian; because the sac being there opened and the clots turned out all risk of venous obstruction is prevented. For the same reason where the Hunterian operation is preferred, as is generally the case in popliteal aneurism, it is important that the operation should be performed early, before the tumour has enlarged to such an extent as to embarrass the free return of blood from the parts below. It is to the observance of this rule in the case just narrated, where the operation was resorted to as soon as it became evident that it was necessary, that the successful issue is to be attributed; neither the operation nor its after treatment having offered any points differing from the ordinary course of such cases.

CASE II. *Traumatic aneurism of the brachial artery.*—For the notes of the following case I am indebted to Dr. John M. Leedom, Acting Assistant Surgeon U. S. A., in whose ward the patient was treated.

David Smith, private Co. "E," 6th Pa. Cavalry, 29 years of age, was admitted to Cuyler U. S. Army hospital on the 29th of June, 1864; he had been wounded by a conical ball on the 12th of the same month, at Trevillian Station; the ball having been extracted on the field from the pectoral muscle of the left side in which it had lodged. The ball had passed transversely across the upper part of the patient's left arm, grazing the brachial artery in its course. His wounds were perfectly healthy and almost cicatrized when he came under observation in this hospital.

The attention of Dr. Leedom was first called prominently to the condition of the artery, by the pain and numbness which the patient experienced in the limb, especially referred to the course of distribution of the ulnar nerve. At the same time the arm became swollen and somewhat œdematous, and a large, pyriform, pulsating tumour was developed over the upper third of the artery. The thrill and *bruit*, though not very well marked, were sufficiently distinct to leave no doubt as to the nature of the affection. A small superficial abscess had formed over the tumour, and had opened externally.

On the 16th of July, 1864, the patient having been brought thoroughly
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under the influence of an anæsthetic mixture (ether and chloroform), an incision was made into the sac, the clots which it contained rapidly turned out, and the opening in the artery being compressed by the finger of an assistant, two ligatures were passed by means of an aneurismal needle, and secured respectively one above and the other below the point of hemorrhage. The lips of the incision were then carefully adjusted with metallic sutures (silver wire), and the limb below the point of ligation wrapped in carded cotton.

With the exception of a chill, which occurred the next day, but was not repeated, the case progressed favourably until the morning of the fifth day after the operation, when profuse secondary hemorrhage, to the estimated amount of 21 ounces, necessitated the opening of the wound. It was now found that one of the ligatures had become partially detached, and the case was treated as one of wounded artery from any other cause, fresh ligatures being applied above and below the bleeding point. No further hemorrhage occurred for thirteen days, when, August 3d, 1864, a second bleeding, to the amount of about 16 ounces, required the wound again to be opened; a ligature was placed this time upon the artery as it emerged from the anterior fold of the axilla. Two days later there was still another hemorrhage, evidently from the distal end of the vessel, and, as the patient was by this time much exhausted by repeated loss of blood, the arm was promptly removed at the shoulder joint by Assistant Surgeon Schell, U. S. A., the surgeon in charge, a flap being obtained from the belly of the deltoid muscle. The ligature which had been placed upon the axillary artery two days previously was suffered to remain, and rendered the operation materially easier; not more than six ounces of blood were lost upon this occasion.

It should be stated that shortly after the first attack of hemorrhage (July 21st), the affected arm became the seat of phlegmonous erysipelas, running on to suppuration, and giving rise to two large ulcers, one over the inner condyle of the humerus, and the other a short distance above. Whether owing to the cacoplastic state of the blood consequent upon this erysipelas, or whether the blood had lost its coagulability from the repeated hemorrhages themselves, amputation, which generally suffices to prevent all further bleeding, did not in this case accomplish the desired result; for the stump had to be opened within thirty-six hours to check a fresh hemorrhage. The blood on this occasion appeared to ooze from the muscular tissue, rather than to proceed from a vessel of any great size, and was controlled by pressure and the application of a solution of the per sulphate of iron.

The next day, Aug. 7th, the main ligature on the axillary artery became detached, and of course a profuse jet of arterial blood ensued. The hemorrhage was, however, quickly arrested by the pressure of a finger, and again deligation was practised high up in the axilla; the wound of amputation being prolonged towards the clavicle. Still another and a final hemorrhage occurred on the evening of the next day, August 8th, also from the axillary artery, its ligature being again loosened by the ulcerative process. The vessel was once more tied as it emerged from beneath the clavicle: the patient survived the last operation about two hours.

No *post-mortem* examination was made, owing to the anxiety of the relatives to remove the corpse.

As in recording any successful case it is important to reflect whether

there were any peculiarities of treatment to which in particular the successful result is to be attributed, so when unfortunately the issue is unfavourable it behooves the surgeon to review carefully the course he has pursued, and ascertain, if possible, if in any respect he might have acted more judiciously. Would a different procedure at the outset have probably resulted more satisfactorily? Would any other course at the beginning have been justifiable under all the circumstances of the case? At what point in the history of this case began the series of phenomena which terminated with death? What modification of treatment, if any, might have averted the fatal issue?

In answering the first of these questions it must be remembered that the arm was greatly swollen, exceedingly painful, and that gangrene from venous obstruction was daily if not hourly imminent; moreover, the fact that the skin was broken over the sac by a superficial abscess, rendered it not impossible that rupture and fatal hemorrhage might occur at any moment. Hence that operative interference was necessary was unquestionable. There were three operations which suggested themselves at this juncture, viz., ligature of the subclavian artery, amputation at the shoulder joint, and the "old operation" for aneurism which was performed.

Even if tying the subclavian artery were not so often attended as it is with an evil result, it promised but little in this case; for the great risk of gangrene from venous obstruction could not but be increased by the coagulation and hardening of the blood in the tumour; and hence this operation was promptly and as I think properly rejected. Amputation at the shoulder joint, if performed at the beginning, would probably have been successful; but would it under the circumstances have been justifiable? The "old operation" as performed, promised quite as well as amputation, and had over it the great advantage of probably preserving limb as well as life. By opening the sac all venous congestion was at once removed, and the limb placed in the most favourable condition for recovery. The risk of secondary hemorrhage, which was the principal remaining danger, would have been about equal after either operation, and after amputation would have certainly been attended with more immediately serious consequences. Hence the first and second questions of our criticism may, I think, be answered in the negative: no other course promised better, and, under the circumstances, any different plan would have been scarcely justifiable.

The answer to the third question is more doubtful. This man was exposed to the same hygienic and meteoric influences before as after his first hemorrhage, yet erysipelas was not developed, till, by loss of blood, his system was depressed to the point where the erysipelatos influence could produce its effect. On the other hand, in spite of the condition of his limb, he did comparatively well for thirteen days, the second hemorrhage not recurring until that period. But this and the subsequent bleedings might not have occurred had not the plasticity of the blood been interfered with by the erysipelatos affection. It is, therefore, impossible to fix the exact point at which the fatal sequence of events began.

Would an amputation at the time of the first hemorrhage have altered the final issue? Probably it would; but the same reasoning that caused its rejection in the first instance, rendered it unadvisable at this juncture. Should the limb have been sacrificed when invaded by erysipelas? Amputation through an erysipelatos member, though occasionally successful, is more frequently followed by a rapid death, and hence should not be per-

formed except when seeming to afford the only though but a faint chance of recovery.

Upon the whole, then, in a careful review of the case, whose unfortunate history has been detailed, it does not appear that any different treatment would have offered a more favourable prospect. Possibly an amputation on the night of the second hemorrhage, Aug. 2d, might have been successful; but the chance would have been but possible, not probable. There are a great many circumstances, that cannot be noted in a written history, which combine to determine a surgeon as to the course proper to be pursued in any individual case; and it is very seldom that it can be said definitely, that if one thing had been done, or another omitted, the results and termination would have been different.

ART. XVI.—*Summary of the Proceedings of the Pathological Society of Philadelphia.*

1865. Jan. 25. *Case of Penetrating Wound of Lung.*—Dr. JOHN ASHHURST, Jr., stated that for the notes of the following case, and for the opportunity of presenting the same to the Society, he was indebted to Dr. C. R. Prall, Acting Assistant Surgeon U. S. A., by whom the patient was treated.

Charles F., a private of Co. "A," 51st Pa. Vols., 26 years of age, was admitted to the Cuyler General Hospital at Germantown, Pa., on the 31st of May, 1864, suffering from a wound received in the battle of the Wilderness, on the 13th of the same month.

He stated that he fell, stunned, when first wounded; and that he remained in an insensible condition for some time. From the beginning he experienced great difficulty of breathing, with but little pain.

When first seen by Dr. Prall, he was found to have a slight grazing wound upon the nose and left cheek, and a small wound immediately above the left clavicle, at its middle third. This wound was healthy, granulating, and presented no evidence of having penetrated beyond the parietes.

The constant dyspnoea from which this patient suffered aroused suspicion of some internal lesion, and the signs elicited by a careful physical exploration confirmed the same idea. There was slight dulness posteriorly at the root of the left lung, and a somewhat loose crepitation in the same locality. Anteriorly the left side of the chest was dull on percussion below, and unnaturally resonant above. The vesicular murmur was but faintly heard at the upper part of the lung, and below was masked by a rough friction sound combined with a blowing amphoric respiration as of air passing in and out of a large cavity through a contracted opening. These signs remained pretty much constant on the left side, except that the line of dulness encroached gradually in an upward direction, while the only sound heard by auscultation in the latter period was a deep-seated friction sound below, as from plastic effusion of no very recent date.

A few days after admission an intercurrent pleuro-pneumonia attacked the middle lobe of the right lung, characterized by the usual physical and rational signs, and ran its course without eventually altering the condition of the patient.

The diagnosis from these observations was a penetrating wound of the left pleural cavity, with some injury to the lung itself, and the ball probably remaining in the chest; pneumothorax, and a gradually increasing amount of effusion, whether serous or otherwise, could not be positively determined.

This effusion finally increased to such an extent as to thrust the heart over towards the right side, so that during the last twenty-four hours of life, the apex-beat bore almost the same relation towards the right nipple that it would have done in health towards the left. At the same time the heart's action was irregular, and so impeded as to render it probable that there was pericardial effusion also.

The treatment, of course, was merely palliative, aiming to mitigate suf-

fering and prolong life. The fatal issue was postponed until June 19th, twenty days after admission to hospital and thirty-seven from the reception of the wound.

An autopsy was made, fifteen hours after death, with the following results :—

Rigor-mortis moderately well marked; cadaver well nourished; the wounds were completely cicatrized.

Thorax only examined. On opening the chest, a gush of pus mingled with serum proceeded from the left pleural cavity. The left lung was completely collapsed, and compressed against the vertebral column; and the heart, as had been diagnosticated during life, much displaced towards the right side. The pleura was covered with old coagulable lymph, and its cavity contained not less than three quarts of serum mingled with pus. The ball, conical in shape, was found to have entered the cavity of the chest in an almost vertical direction, between the second and third ribs, splintering the latter near its vertebral articulation.

Several spiculæ of bone were found at this point, imbedded in the lung. The ball had then passed downwards striking the last rib, also near its vertebral articulation, loosening and partially displacing it inwards, without, however, producing any fracture. The ball itself was found lodged upon the diaphragm, and partially encysted.

The right pleura was covered in patches with coagulable lymph, and its cavity contained a certain amount of serous effusion. The lung appeared to have resumed its healthy condition. The pericardial sac contained about four ounces of serum, the heart itself appearing perfectly normal.

From the above enumeration of pathological phenomena it can be seen how very closely the *post-mortem* appearances conformed to the lesions indicated during life by physical exploration.

A practical question suggested by this history, is whether the operation of paracentesis should have been performed. Had the ball not lodged in the chest it would have been clearly indicated; but with the foreign body remaining, though it might have prolonged life, it would appear that it could not eventually have averted the fatal issue.

Specimen of Cystic Tumour of the Axilla.—Dr. JOHN ASHHURST, Jr., presented a tumour which was removed from a patient in the Episcopal Hospital, who was admitted during the service of his colleague, Dr. John H. Packard. It was situated low down in the left axilla, and was removed by careful dissection, the patient being under the influence of ether. The cyst was ruptured during the operation, and discharged about two fluid-ounces of a semi-fluid substance of a yellowish-white color. The entire cyst was removed, and the wound is rapidly closing by adhesion. The tumour was about the size of a hen's egg.

Dr. Packard had previously operated upon the same patient for the removal of a precisely similar but rather larger tumour situated on the back. The apparent death of this patient from chloroform, during that operation, has been graphically described by Dr. Packard, in the January number of the *American Journal of the Medical Sciences*.

The induction of and recovery from anæsthesia, in Dr. Ashhurst's operation, were attended by no unusual phenomena, except that the stage of excitement was slightly prolonged, and the amount of ether used rather large than is generally required.

Metastatic Abscesses following Erysipelas.—Dr. JOHN ASHHURST, Jr., Feb. 22d, related the following case:—

John Farlow, private Co. "C," 28th P. V., aged 44 years, entered the Cuyler Hospital, March 29th, 1864. While at home on furlough he had been attacked with erysipelas, which affected his right lower extremity. When first seen by Dr. Wm. R. Dunton, in whose ward the patient was placed, his limb was found red and swollen, the tumefaction reaching to the middle of the thigh; the colour was livid, and the temperature of the inflamed parts lower than normal. The constitutional condition of the patient was at the same time typhoid in the extreme. After the erysipelatous blush had begun to subside, which occurred about the 10th of April, it was found that the knee-joint was very much swollen and evidently distended with fluid. This distension increased for about a week, and then gradually diminished. A few weeks later (in the early part of May) the left knee-joint began to swell, and finally attained the size of a man's head, when it pointed, opened spontaneously, and discharged about one pint of pus. About this time a bed-sore formed over the sacrum, and rapidly enlarged; another formed shortly after over the right hip. The discharge from the left knee-joint ceased a few days before death, but began again the day of the fatal issue, which ensued on June 3d, 1864.

The treatment throughout had been nutritious, tonic, and stimulating, with the local application of mucilaginous washes.

An autopsy was made twenty-four hours after death with the following results: Absolutely no *rigor-mortis* whatever; the cadaver was much emaciated, with great swelling of both lower extremities. The head was not examined. There was some hypostatic congestion of the lungs, and the cardiac cavities contained fibrinous clots: no other abnormal appearances in the thoracic viscera. The liver was very fatty, and slightly larger than normal; the other abdominal organs seemed healthy. An incision was made into the right knee-joint, and gave exit to not less than a pint of pus; the articulating surfaces of femur and tibia were found much eroded, nearly all cartilaginous structure having disappeared. A similar condition of things prevailed on the left side. The purulent deposit on the left side being considered secondary or "metastatic," the great venous trunks on the right, and the ascending cava were carefully examined, without any traces of phlebitis or of purulent absorption being detected.

Case of Idiopathic Erysipelas.—Dr. JOHN ASHHURST, Jr., communicated the following:—

James H. was admitted to the Episcopal Hospital on January 20, 1865, to be treated for a simple fracture of one of the metacarpal bones of the right hand.

He was an Irishman, a weaver by trade, and stated his age at 45, though his appearance would have given the impression that he was at least 15 years older. The injury was treated in the usual way, and he was about to be discharged, when, on the 5th of February, he complained of chilliness and a slight sore-throat; on the 7th the throat affection had increased; there was considerable swelling and submucous infiltration, especially involving the uvula, and a tendency to the exudation of a tough yellowish matter, which came away in shreds like a false membrane. At the same time there was a good deal of constitutional disturbance, characterized by a dry and furred tongue, hot skin, and rapid but feeble pulse. The next day (8th) the characteristic flush of erysipelas appeared upon his face.

During the whole course of the disease the throat symptoms remained the most prominent part of the affection; the parotid and submaxillary glands became also enlarged and indurated. On the 13th, while all the local manifestations of the disease were much ameliorated, the constitutional condition of the patient had become decidedly worse, the pulse being exceedingly compressible, and *subsultus tendinum* and low muttering delirium being constantly present. He died on the morning of the 14th of February, that being the ninth day of the disease.

An autopsy was made about six hours after death. The examination was necessarily incomplete, on account of the anxiety of the relatives to remove the corpse, and the only parts, therefore, examined were the throat, chest, and abdomen.

The entire tract of the larynx, trachea, and bronchi, was actually inflamed, the erysipelatous eruption having travelled downwards in the course of the air-passages.

There were occasional patches of tenacious exudation, and in one point at the lower part of the trachea a small ulcer. The larynx and one of the tracheal rings were ossified.

The lungs were somewhat congested posteriorly, and the heart contained large fibrinous clots. The blood in the other parts of the body was exceedingly black, and of a consistence approaching to that of molasses.

The liver was exceedingly contracted, not more than half the usual size, though of normal weight (about 54 oz.). It presented a perfect specimen of the "hob-nail" form of cirrhosis, with a tendency to fatty degeneration. The other organs examined appeared healthy.

March 22. Hairs in Ovarian Cyst.—DR. HUTCHINSON exhibited the specimen, and gave the following history of the case from which it was derived :—

Mary R., æt. 45, was admitted into the Episcopal Hospital Nov. 12, 1864, with ovarian dropsy.

She said that she had had but one child, which was delivered with forceps, and lived only three weeks, and that the dropsy commenced immediately after birth of her child, and that during the twenty years which had since elapsed, she had menstruated irregularly and been tapped four times; the liquid obtained being always of the colour of porter. Upon taking charge of her on the first of the present year, I found her emaciated and feeble, her abdomen moderately distended, and yielding on percussion on its whole anterior surface, from the symphysis pubis to the ensiform cartilage, a flat sound—the enlargement being rather greater on the left side; change of position effected no change in the physical signs.

By means of a vaginal examination, I discovered that the uterus was very much prolapsed but otherwise healthy.

There was no disease of the heart, lungs, nor of any of the important viscera. No enlargement of the external abdominal veins, and but little œdema of the feet and legs.

She died Jan. 27, 1865.

The autopsy was made sixteen hours after death.

Head not examined.

The organs contained in the thoracic cavity were healthy, but were suffering from the effects of pressure.

Upon opening abdomen, it was found that the dropsy had taken its origin from the left ovary, and that the cyst was tightly adherent to the

abdominal walls, extending from the pelvic cavity to the ensiform cartilage and compressing the intestines against the spinal cord.

The right ovary was converted into a caseous mass, and contained a quantity of hair.

Drs. D. Hayes Agnew and Edward Rhoads, being appointed a committee to investigate the structure of the hair found in the ovary, made the following report:—

April 12. Dr. Edward Rhoads presented the following report in regard to the preceding case: The hairs found in the ovarian cyst presented by Dr. Jas. H. Hutchinson were identical in their structure with hairs upon the surface of the body. Each possessed a cortical portion of imbricated scales, a medullary substance, and a bulbous extremity; this last being attached to no stationary papilla but loosely imbedded in the cheesy or sebaceous matter. The hairs varied in thickness, and in length from $\frac{1}{4}$ to $1\frac{1}{2}$ inch; their colour was usually reddish-yellow, occasionally brown; no regularity appeared in their distribution. The occurrence of hair in ovarian cysts is noted by a number of observers, but only a few accurate investigations are recorded. Lebert gives merely a plate of the hairy mass, hairs, and “*matière sebacé.*” Rokitansky, Hewitt, and others make incidental mention of their occasional presence. In the proceedings of the Obstet. Soc. of Edinburgh (*Edin. Med. Journal*, vol. 7, p. 886), we find reports of two cases, by Dr. Gillespie and A. R. Simpson. From that of the latter we quote “On opening the sac a considerable ball of loosely tangled hair was found lying in its interior, and two or three long hairs of a similar kind were seen growing from follicles in a skin-like patch on the posterior wall, toward its lower end. * * * He (Dr. Alex. Simpson) was not aware whether any observation had ever been made in such cases in regard to the colour of the hair, but in the case which he had brought under the notice of the Society, the hair contained in the ovarian cyst was strikingly like that growing on the head and pubes of the patient, and it would be interesting to know whether this obtained as a general law.”

“Dr. Gillespie stated that the hair contained in the cyst he had exhibited, was of the same colour as that on the surface of the patient’s body.”

Dr. Hutchinson states that there was not this correspondence in the case under consideration, the cystic hairs being reddish-yellow, those upon the head brown.

March 22. Surgical Fever.—Dr. RHOADS in presenting these specimens said: They have not the charm of novelty, but certainly do possess whatever of interest attaches to a disease of dangerous character and frequent occurrence, and the pathological, but more especially the therapeutical relations of which are imperfectly understood. They were taken from the body of a young man who died on Tuesday, March 21st, after an illness of seventeen days. He entered the Pennsylvania Hospital eighteen hours after a car-wheel passed over the anterior portion of his left foot, comminuting the bones of the part and tearing the soft tissues. Amputation at the tarso-metatarsal articulation was at once performed by Dr. Morton. The plantar flap sloughed, but the dead portion soon separated, leaving the wound covered with healthy granulations. Beyond the ordinary irritation consequent upon such an operation and frequent restlessness, no marked constitutional symptoms presented themselves until Sunday, March 12th. On the preceding Friday some redness and swelling appeared in front of his ankle along the edge of the dorsal flap, and two small subcutaneous abscesses formed there,

no material change occurring in the wound's appearance. On Sunday afternoon a severe chill, half an hour in duration, ushered in an irregular series of rigors ending only with death. A few hours later red lines appeared, commencing in front of the ankle and extending obliquely upward and inward to the inner side of the knee. With the redness there were swelling and induration. These continued together to the middle of the thigh, and then *ceased abruptly*. The left inguinal glands were, however, much enlarged. On Thursday a circumscribed subcutaneous abscess, which had formed on the inner aspect of the leg, about midway between the ankle and knee, was opened, and, resting upon the deep fascia forming its floor, appeared the internal saphena vein. This was distended and quite firm. Through a puncture made in its walls with a bistoury, exuded abundantly no blood, but a thick puruloid fluid, exhibiting under the microscope much granular matter with corpuscles (uni- and bi-nuclear, but usually granular or fatty), and coloured flakes, evidently altered hæmatin. Blood from the patient's finger at this time contained a positive increase in the number of white nucleated corpuscles. The general symptoms had assumed the most decided character—persistent rigors, irregular as to time of occurrence, severity and duration; colliquative sweats, macerating the skin, the hue, the shrivelled fingers, the heavy odour, the dull, lethargic expression of countenance, the uneasy passive delirium, the rapid pulse and hurried respiration, the dry tongue, the tympanitic abdomen and diarrhœa, the heavy alkaline urine, slightly albuminous, with its copious deposit of phosphates and urates, combined to render the case complete and unmistakable. There were moist rales, too, in the lung, with coarse friction sound and cough. After the first chill the wound ceased to produce healthy pus, discharging sanious fluid merely.

Constitutional treatment.—Potass. permang. Later tr. ferri chlor. and quin. sulph. with alcoholic stimulus and beef-tea. Local emollient applications to leg—yeast poultice and permang. potash to stump.

Autopsy.—*Thorax.* Lungs congested, but everywhere inflatable except in the dark areas surrounding the numerous scattered abscesses. Pleura for the most part covered with a cheesy, straw-coloured exudation, and bathed in abundant fluid grumous with flocculi of the same. Heart healthy in appearance; its chambers filled with fluid blood and soft coagula.

Abdomen. Liver large, its cells healthy. Spleen slightly increased in size. Mesenteric gland conspicuous; intestine distended with gas. Peyer's patches distinct, presenting the dotted ("shaven-beard") appearance. Kidneys rather large, with engorged capillaries, containing frequent points of stasis or coagulation, both in the anastomosing network and in the convolutions of the glomerules.

The blood everywhere contained *very many* white corpuscles with one, two, sometimes three, distinct, and frequently reniform nuclei; the red appearing darker than in health, readily giving up their colouring matter to water, and more disposed to cohere in masses than to arrange themselves in rolls. All the lymphatic glands on the left side of the pelvis and in the corresponding groin were much swollen. The internal saphena vein and its branches as far as the middle of the thigh (at a point corresponding to the cessation of the external redness and induration) contained no blood but the puruloid fluid before mentioned, from which the hæmatin flakes, noticed five days previously, had now disappeared. Above the point in the thigh the vein was entirely occluded by a firm clot, the lower end of which gradually dissolved into the matter below. The same condition obtained

in the deep veins, but there the changes had not progressed so far; and in the vessels of the opposite limb no abnormal appearances presented themselves.

Without at this time entering into a discussion of the various theories advanced in connection with this disease, permit me to call attention to the following facts ascertained in the case under consideration:—

1st. The evident irritation of the lymphatics of the part, and swelling of their glands above with corpuscles exactly resembling those occurring in large numbers everywhere through the blood.

2d. The impossibility of the white venous fluid entering the general circulation from which it was separated by a firm coagulum entirely closing the vessel.

3d. That this white venous fluid was evidently the debris of a clot, as shown by its microscopic characters, particularly the early presence and later absence of hæmatin flakes, and the general granular and fatty rather than nucleated structure of the corpuscles.

4th. That the corpuscles of the blood and lymphatic glands were different from the corpuscles of the venous fluid.

April 12. Interstitial and Necrobiotic Degeneration of Muscle.—Dr. RHODES exhibited the specimen and made the following remarks:—

The patient from whom this specimen was removed, had suffered for 18 years with strumous disease (ankylosis and tumour) of the knee-joint. The muscles of the thigh had been long entirely unemployed; those below the knee were used slightly in moving the foot. These latter were pale, atrophied, and had undergone interstitial fatty degeneration. The fibres preserved their transverse striæ well marked, but instead of their connecting tissue appeared bead-like rows of fat vesicles. The muscles of the thigh were represented by yellow masses retaining the original shape merely, and exhibiting under the microscope absolute elemental fatty degeneration, as well as much fat in the interspaces. Very rarely could any trace whatever of the original striation be discovered, but sheaths empty and collapsed, or filled and transparent with oil; or retaining it in small globules mingled with granular matter, filled the field.

Case of General Tuberculosis in a Child.—Dr. JOHN M. LEEDOM communicated the following case of this:—

Mary K., the little patient from whom this specimen was obtained, had been suffering for about seven years with general tuberculous disease, which first manifested itself in the form of hydrocephalus. The acute symptoms of this affection yielded to treatment, though the head always remained unnaturally large. She went through all the diseases to which childhood is generally liable, I myself having attended her in measles, scarlet fever, and whooping-cough. She dragged on a miserable existence until the night of the 5th of the present month (March, 1865), when an attack of more than ordinary oppression terminated her brief career.

A *post-mortem* examination was made thirty-six hours after death, with the following results: Rigor mortis well marked. On opening the chest, masses of tuberculous matter about the size of nutmegs were found in the walls of the pericardium, which contained about one pint of fluid. Both surfaces were much roughened, that of the heart presenting a peculiar honeycombed appearance. The pleura was studded with tuberculous deposits, roughened in patches, and adherent to the anterior thoracic parietes.

Both lungs were infiltrated with tubercle, and around the bifurcation of the bronchi were large tuberculous masses, which creaked under the knife like scirrhus. The liver was extremely enlarged, and also infiltrated with tubercle. The spleen, pancreas, and kidneys were also tuberculous; the latter organs, however, less than those previously mentioned. The wishes of the parents prevented any examination of the head.

This case is of interest on account of the extent and diffusion of the tuberculous deposit, and the youth of the patient.

April 12. Gangrene of Foot, following Typhoid Fever.—Dr. THOS. H. ANDREWS exhibited the specimen and read the history of the case from which it was derived, as follows :—

Jno. Mullen, aged 23; labourer; a native of Ireland; a man of not very good habits, oftentimes drinking to excess, but always enjoying good health, with the exception of an attack of intermittent fever and one of primary syphilis several years ago, which to a slight extent undermined his constitution. On the 29th of last November he was seized with a chill, headache, pain in back and limbs, deficient appetite, great restlessness, &c. He continued at his work, however, for a day or two, but at last was obliged to take to his bed. He immediately called in a physician, who told him he had typhus fever, of which disease there were a number of cases in his neighbourhood. His symptoms gradually increased in severity, until at last he sank into a state of stupor, in which condition he remained for two weeks, after which he began to convalesce. He says that he felt himself so well that he got out of bed; but, upon arising, discovered that he was very weak, and that his limbs felt stiff. He remained out of bed for several hours, when he began to suffer intense pain in both feet, more especially in the right one, which was swollen. He immediately returned to bed, and called in his physician, who made an incision on the dorsal aspect of the foot, which gave exit to nothing but blood, and afforded no relief. The swelling continued, and at night the foot had assumed an intensely livid appearance, and before two days had passed became black. The gangrene extended very slowly up the leg, until about six weeks ago, when a line of demarcation formed, and ulceration separated the soft structures of the gangrenous from the healthy part.

He was admitted into the Pennsylvania Hospital, April 4, 1865, in a debilitated condition, the pulse being frequent, feeble, &c. Tonics and good nutritious diet were immediately ordered, the part being dressed with a solution of permanganate of potassa, to correct fetor. Amputation was performed four days later, by the ordinary flap operation, there being at the time very little bleeding, and it being necessary to use only two ligatures.

On examination of the artery, we found its walls thin. Under the microscope it appeared healthy, except where the fibres of the external coat contained oil, there being no atheromatous or calcareous degeneration. The microscope revealed an advanced state of fatty degeneration of the muscles, their striæ being obscured or obliterated by yellow granules and small oil-globules, and their interstitial tissue replaced by fat.

On the Pathology of Secondary or Metastatic Abscesses.—Dr. JOHN ASHHURST, Jr., read the following paper :—

The subject of metastatic abscesses, and the pathological theories which have at various times been advanced in attempting to explain their occurrence, have more than once been discussed and commented upon at meetings

of this Society; and in the first volume of our proceedings may be found an elaborate and excellent paper by Dr. Packard upon the subject. As it is to be presumed that this paper and the doctrines it embodies are familiar to most members of the Society, I shall not scruple to make free use of it, and to accept the authorities there quoted without in all cases going back to the originals.

The prevailing theories of the formation of metastatic abscesses, even at the present day, are expressed in the several terms pyæmia, purulent absorption, and purulent infection. I propose to examine very briefly the circumstances under which metastatic, or as they might more correctly be termed secondary, abscesses arise, and to ascertain, if possible, what are actually the pathological conditions to which they are due. Let us suppose a typical case; an amputation or resection has been performed for an injury in a perfectly healthy person; the wound is suppurating freely, and everything promises well, when without apparent cause repeated rigors are experienced, the patient falls into a typhoid condition, and dies with his lungs, liver, and perhaps other parts of his body filled with collections of what is shown by all the tests applied to be pus. There seem, at the first glance, to be three organic systems by the agency of which these secondary deposits might possibly have been produced; these are the lymphatic, the vascular, and the nervous systems respectively. Let us inquire in turn how far each of these may have been concerned. That an abscess, which is in one sense certainly secondary, may be due to the influence of the lymphatic vessels, is a matter of frequent observation; as when a felon is accompanied by inflammation of the lymphatic glands at the elbow and in the axilla, inflammation which may run on to suppuration; but the abscess thus formed is not the metastatic or secondary abscess which forms the subject of the present investigation. And, indeed, as clearly pointed out by Virchow,¹ the structure of the lymphatic glands of itself prevents pus as such from entering the system through this medium; for the pus corpuscles will almost certainly be arrested in the very first glands to which they come, while "even the fluids which succeed in passing them, will during that passage lose a great part of their noxious properties." Hence it may, I think, be safely asserted that the lymphatic system is not concerned in the production of the so-called metastatic abscesses.

The second possible medium of communication which we are to consider is that by means of the bloodvessel system, capillaries and veins. And the name pyæmia presents itself as a most convenient and plausible explanation. Pus-blood (as it is anglicized by Dr. Swaine, the translator of Rokitsansky), if a fact, would seem to leave no further room for discussion; and here our arguments in the negative may be stated under three heads, viz: 1. Pus does not enter and is not formed in the blood. 1. Pus has never been found in the blood. 3. If pus be injected into the blood, it does not cause the formation of metastatic abscesses.

The idea that pus is actually absorbed by bloodvessels, or finds its entrance by openings, pathological or artificial, is, I believe, no longer seriously entertained by any one. In fact, as remarked by Virchow, in the rare case of an abscess forming a communication with a vein, hemorrhage is more likely to result than any purulent absorption.

The liquid part of pus (liquor puris) may indeed enter the vascular sys-

¹ Cellular Pathology, Chance's translation, p. 184.

tem, as happens in the spontaneous absorption of abscesses; of which phenomenon a number of instances may be found detailed in the *Medical Times and Gazette* for March 20, 1858; but the fluid part merely of pus is not pus, nor is its absorption attended by any of the symptoms of *pyæmia* so-called. But though generally acknowledged that pus cannot enter the vascular system from without, it is still maintained by some surgeons that it is produced in the veins themselves as a consequence of suppurative phlebitis. But this suppurative phlebitis is not a primary affection; a clot, as shown by Cruveilhier, is always present first. Moreover, this phlebitis is an affection strictly of the walls of the vessel, not of its contents. The process as traced by Virchow is as follows: A clot is formed in a vessel from some cause mechanical or otherwise. This clot or "thrombus" softens and disintegrates from its centre, forming a whitish, puriform, but not purulent liquid. The thrombus, in the meanwhile, is augmented by fresh depositions at its extremities, and by the time the cavity forming within it has reached the walls of the vessels, the contained *débris* are effectually sealed from the circulating blood. "Only sideways does the softening extend, until it at last reaches the wall of the vessel itself; this becomes altered, it begins to grow thicker, and, at the same time, cloudy, and ultimately even suppuration takes place within the walls."¹ Our first point may, therefore, I think, be considered as established, viz., *that pus does not enter, and is not formed in the blood.*

The assertion that pus has never been observed in the blood may be sustained by the fact recorded by Virchow, p. 164, that "*a pus corpuscle can be distinguished from a colourless blood cell by nothing else than its mode of origin;*" and there is no doubt in my own mind that those cases, in which it has been supposed that pus was detected in the blood, were really instances of leucocytosis or leukæmia, and not of *pyæmia*, which name in the words of Virchow "must as designating a definite change in the blood be entirely abandoned."

The third point proposed needs no further demonstration than the experiments of Sedillot referred to by Dr. Packard, in the paper already quoted. That distinguished surgeon made the crucial observation of repeatedly introducing pus into the veins of lower animals, without eliciting any marked results.

While, however, the bloodvessel system is not, as has been seen, directly concerned in the production of metastatic abscesses, it is indeed the seat of a process, to which in the immense majority of cases these secondary formations are due. And this process is that which Virchow has so beautifully traced out, and to which he has given the name of *thrombosis*.

It may be remembered that in speaking of suppurative phlebitis, the observations of Cruveilhier were referred to, showing that the formation of a clot is the initial step of the process. Now, in the case of amputation or resection, which we have supposed, clots are formed in the neighbouring bloodvessels. If everything goes well, if the patient be not weakened by hemorrhage, nor attacked with erysipelas, or other source of depression following the operation, these clots will, in all probability, be absorbed or organized,² and the wound will heal without further difficulty or delay. But, if the surrounding circumstances be not so favourable, these clots or *thrombi* may run on to softening and degeneration; a whitish, granular, puriform, but not *purulent* substance is developed in the centre of the clot,

¹ Op. citat., p. 203.

² See Paget's Surgical Pathology, p. 134, etc.

and gradually extending to the walls of the vessel, produces a "peri or meso-phlebitis," followed by genuine suppuration of the vessel's walls and the surrounding areolar tissue. Thus are produced the abscesses in the immediate neighbourhood of a wound, which so frequently occur after operations in overcrowded hospital wards.

Again, these thrombi enlarge by accretion until they project into the neighbouring venous trunks; and then, by the returning current of blood, small portions may be detached and carried to points more or less distant from the place of original formation; these fragments or *emboli* may be even carried through the heart and the arterial system into any organ or structure of the body to which the vascular system penetrates, and by the same process of peri-phlebitis give rise to abscesses in the lungs, liver, spleen, connective tissue, or even in the joints, the articular cartilages becoming diseased from the embolism of vessels in their immediate neighbourhood. In more favourable cases these emboli (the metastatic coagula of Rokitansky) may be redissolved, and give rise to no further trouble.¹

From this simple exposition of Virchow, which seems to me to bear the stamp of truth upon its face, we may, I think, conclude that the formation of metastatic or secondary abscesses is due to this process of *thrombosis* and *embolia*, if not in all, at least in the immense majority of cases. The same explanation is clearly applicable to the hepatic and pulmonary abscesses which follow upon fractures and other injuries of the head; and in this way suppuration might occur in distant organs, even without pus existing at the original seat of injury.

There are, however, some cases of secondary purulent formations, which though perhaps explicable by the theory of thrombosis, as above enunciated, seem to have a more probable explanation in the action of the nervous system. It is the prevailing tendency at the present day to account for every morbid condition by the doctrines of humoral pathology; and even Virchow has assisted in throwing undeserved disrepute upon the solidists or neuropathologists. That various modifications in the functional activity of different parts of the body may be communicated by sympathy, or more definitely by *reflex action*, has been the subject of repeated observations from the classical case related by Graves² where the prick of a needle produced reflex paralysis of sensibility, down to the brilliant observations of our fellow members, Drs. Mitchell and Morehouse, at the Christian St. Hospital.³ It is, moreover, well established that modifications of nutrition and secretion can be produced through the medium of the nervous system. The sympathetic inflammation of one eye from an injury to the other has been repeatedly noticed by ophthalmic surgeons, and Mr. J. Vose Solomon has reported a very interesting case, in which inflammation of the sound eye followed the introduction of a glass mask into the orbit from which its diseased fellow had been some time previously removed.⁴ Other examples of modified nutrition are given by Drs. Mitchell, Morehouse, and Keen in their essay on *Gunshot Wounds and other Injuries of Nerves*.⁵

Now, suppuration is but the third stage of inflammation,⁶ and as we have seen that inflammation in its early stages may be transmitted by reflex action through the nervous system, it is at least highly probable that

¹ Rokitansky; Pathological Anatomy, Syd. Soc. Trans., vol. i. p. 168.

² Clinical Medicine, p. 344.

³ Circular No. 6, Surg. Gen. Office U. S. A., March 10, 1864.

⁴ Dublin Quar. Journ., Feb. 1863.

⁵ See especially case of Schively, p. 87.

⁶ Gross, Pathol. Anat., p. 72.

suppuration may be reflexively induced in a like manner. And there are certain cases of symmetrical purulent formations, which it would be difficult to account for in any other way. I had the honour of reporting a case of this kind to the Society in the month of February of the present year. Idiopathic erysipelas of one lower extremity had been followed by suppuration in the knee-joint, and a month later an abscess in the opposite knee-joint was formed, the autopsy showing no purulent deposits in any other part of the body. Now, although this might have been produced by thrombosis, I confess the balance of probability to my mind is decidedly in favour of the second abscess being a reflex phenomenon.

To sum up, then, abscesses, in one sense secondary, may be produced through absorption by the lymphatic system; but the suppuration thus caused could never extend beyond the first lymphatic gland, which would form an insuperable barrier to the further passage of pus. Pyæmia is a most unfortunate misnomer, for in no sense is the blood the actual means of purulent transfer, though through the medium of the vascular system, by the processes of thrombosis and embolia, secondary or metastatic abscesses are indeed produced. Some cases again of symmetrical suppuration are best accounted for by the action of the nervous system, according to well-known physiological and pathological laws.

The phenomenon of shivering, which so frequently accompanies the process of secondary or metastatic suppuration, may, I think, be plausibly attributed to the influence on the nervous system of the sudden cutting off of the blood supply by the process of embolia; just as the sudden diminution in the supply of blood to the brain, by ligation of the carotid artery, is not unfrequently followed by convulsions.

I cannot conclude this brief sketch of the process of secondary suppuration, without referring to the theory of a "pyogenic diathesis," so ingeniously and ably advocated by Dr. Packard in the paper already frequently quoted. I cannot give my assent to this theory, for the simple reason that I do not see its necessity; the occurrence of secondary abscesses after injuries or surgical diseases can, I think, in all cases be satisfactorily accounted for on established mechanical and physiological principles, while I look upon the suppuration following typhoid and other fevers, as simply symptoms of those diseases, which may not indeed be present in every case, but which are just as much a part of the several affections in which they occur, as are their characteristic eruptions or any other pathological lesions which we take for granted, without assuming any special diathesis to account for them.

I have not complicated this paper with any allusions to the conditions denominated by Virchow *ichorrhæmia* and *septhæmia*, which are entirely distinct from the pathological state which gives rise to the secondary or metastatic abscesses that have been considered.

REVIEWS.

ART. XVII.—*A Treatise on Military Surgery and Hygiene.* By FRANK HASTINGS HAMILTON, M. D., late Lieutenant-Colonel, Medical Inspector U. S. A.; Professor of Military Surgery and Hygiene, and of Fractures and Dislocations in Bellevue Medical College; Surgeon to Bellevue Hospital; Prof. of Military Surgery, &c., in Long Island College Hospital; Author of *Treatise on Fractures and Dislocations* and of a *Practical Treatise on Military Surgery*. Illustrated with 127 engravings. 8vo. New York: Baillière Brothers, 1865. pp. 648.

THIS volume contains twenty-six chapters. Following the introduction are seven which treat respectively of the examination of troops, their general hygiene, their accommodation in tents, barracks, huts, &c., of hospitals, preparations for the field, the hygienic management of troops upon the march, and the conveyance of sick and wounded soldiers; the remaining chapters are devoted to the consideration of the injuries received in warfare, and of those diseases to which soldiers are more particularly subject, with a final one on the employment of anæsthetics in major amputations and in other severe surgical operations after gunshot injuries.

The introduction is mainly devoted to the question of the military position of medical officers, the rank, and the authority they should enjoy. This question is one more delicate to treat than difficult to decide. It cannot be denied that the medical officers are entitled to the gradations of rank precisely as other officers are, and that they have been unjustly treated by Congress in its legislation on the subject. They should be on the same footing with the other staff officers. Common sense would seem to show that the medical directors of armies, corps, and divisions should have the same rank as the chief quartermaster, chief commissary of subsistence, chief engineer, chief of ordnance, &c., of the same bodies. Medical officers should have the same authority in their departments that other staff officers have in theirs, no more and no less, and in all respects should be subject to the commanding officers, precisely as are other officers. In the case of a regiment, which is always theoretically commanded by a colonel, or of a smaller body of men, or a detached garrison, the medical officer should be subject to the orders of the commanding officer, no matter what his rank may be. Any other principle than that which recognizes that the officer highest in rank in the line of the army shall command is erroneous, and will lead to disaster. No quartermaster, commissary of subsistence, engineer, or other staff officer can command troops except by virtue of a regimental commission, if he has one, and the surgeons should obey the same rule.

The line officers, in an army officered by intelligent men, who have been brought up to their profession, or who have learned it by experience in the field, are well acquainted with the various subjects of the diet and dress of soldiers, details of camps, receipts for food, tents, soldiers' houses, equipments, &c. The medical officer who interferes in such matters will meet

with opposition, and properly so. In fact, the relations between the medical and line officers would in a well organized army make such interference almost impossible, and should it occur, it would show that one has gone beyond or the other has fallen behind his duty.

An instance, showing that officers who have thoroughly learned their professions can take care of their men, is given at page 93, in the chapter on the general hygiene of troops, where Dr. Hamilton cites the cases of the 7th Massachusetts Regiment, Colonel Russel, and the 2d Rhode Island, Colonel F. Wheaton. Col. Russel, we know, entered the army from West Point in 1845, and Col. Wheaton entered from civil life in 1855. Dr. H. says:—

“In our opinion the effectiveness, value, and bravery of these two regiments were no less due to the splendid talents of their respective colonels than to the perfect system of camp police maintained from day to day by surgeons Holman and Carr.”

Now the camp police of a regiment is the charge of the officer of the day, a line officer. Is it not quite likely that these two efficient colonels required not only the officer of the day, but also Surgeons Holman and Carr, to do their duty, and that, therefore, the camp police maintained from day to day was perfect?

In the seven chapters of this work following the introductory one, the titles of which have been given above, we do not find much to comment upon. They contain a great deal of useful advice upon the various topics to which they are devoted. At page 76, three meals a day are said to be necessary for a soldier. Soldiers who are on a march soon get used to two meals a day. Old soldiers never take more than two. The division of the men into squads of three or five for cooking the food, as recommended by Dr. H., is not, we conceive, a good one. Where camp kettles can be carried the cooking should be by companies. The men can then make soup, and soup has been universally acknowledged to be the best constant diet for the soldier. When the cooking is done in small messes, as here recommended, soup cannot be made.

The remaining eighteen chapters, are, as already stated, devoted to military surgery.

Three years since, we laid before the readers of this journal, an account collected from the works of Scriver, Longmore, Guthrie, and Macleod, of the surgical experience of the Crimean Campaign, and on the same occasion took a brief glance at the then condition of the surgery of war. Since then a large hospital experience during the civil war in this country, and the valuable observations and memoirs contributed by others, have led us to modify or change our views in regard to many points connected with military surgery. We propose, on the present occasion, briefly to state some of these changes, and also to indicate some points which appear to us to demand more attention than they have yet received. While doing this, we shall refer to what is taught and also to what is omitted in the volume before us.

According to our observation, the common opinion as to the action of conical balls is not correct. It is not their point that always first strikes, for they have been found imbedded in the epiphysis of a bone by the base. They do not go straight forward, without deviating in their course from the resistance of tissues, as we have witnessed in innumerable instances. In one the ball entered alongside of the nose below the eye, and after divid-

ing the portio dura on the same side, lodged in the hollow of the back of the neck, whence we removed it. We have taken several balls from the walls of the chest, when the wound of entrance was on the opposite side, and there was no reason to suppose that the cavity of the chest had been traversed. We recall an instance where a ball was removed from the anterior wall of the abdomen, the contents of which showed no symptom of lesion, that had entered one of the buttocks and had broken off a small sharp piece from the ilium of the same side near the superior spinous process. That the splitting of a conical ball cannot occur, and that it never touches a bone more gently than to occasion its utter destruction, as Macleod puts it, we have by no means found to be the case. We have again and again removed a ball in several pieces from a limb when the bone had been struck and not broken. In one instance we removed a foreign body from above the elbow-joint, on the internal edge of the humerus, on account of the pain complained of in the terminal branches of the ulnar nerve, the skin had entirely healed over, and there was no trouble whatever at the seat of injury; it was a ball cut by the sharp edge of the bone almost exactly into two, still united by a very thin piece of lead, lying against the humerus, which was not broken. We recollect removing a conical ball from the external condyle of the right femur, where it was imbedded in the bony tissue, without having splintered the bone. In another case, which we remember pointing out to Inspector-General Muir, of the British army, who told us the man would die unless the limb were removed, in which he was mistaken, there was a hole through the lower end of the tibia from before backward, and no splintering of the bone had taken place, at least none in the direction of the ankle-joint.¹ Lastly, as regards the extraction of conical balls, we have not found it to be more difficult than to remove a spherical one; indeed we have found the contrary to be the case, as the latter are decidedly more difficult to seize hold of.

In the local treatment of gunshot wounds, water dressings at the temperature agreeable to the patient are very generally conceded to be the best. The advice given by Dr. Hamilton (pp. 205 *et seq.*) on this point is good, as is also that in regard to the application at the proper time, of the roller bandage, the advantage of which, when well applied, cannot be overestimated. The abuse of the probe and the rough handling of the parts have been so well commented upon by Dr. Hamilton that we will transcribe what he says on this subject:—

“It ought to be well understood that granulations, whether forming in the track of a sinus or at the surface, must be treated with great tenderness; any lesion of their delicate structure, whether occasioned by a probe, by the dressings, or by pressure with the hands, and which is sufficient to cause them to bleed, is hurtful; the lesion thus produced must be again repaired, additional inflammation and suppuration result, as a direct consequence of the injury, and in a greater degree the suppuration is increased and rendered more acrid, indirectly by the decomposition of the blood which remains. The simple act of introducing a probe into an irritable sinus very often develops an irritative fever which continues several days, and not unfrequently determines an erysipelatous inflammation which results in death. . . . Violent pressure with the hand up and down a limb, in order that the last drop of pus may be forced out, is more hurtful to the patient than probing, just in proportion as it is more painful. . . . Caution must be exercised even in the removal of detached fragments of bone, when patients are exhausted by long suppuration.”

¹ The injury in this case may not have proceeded from a conical ball, but this is not probable.

Contrary to what is very generally said by modern authors in regard to the use of the trepan, while we believe we have cause to regret not having had recourse to it in some gunshot wounds of the head, we always were pleased with the result when we did so. As the subject is one of great difficulty and of particular importance, and moreover, as very little has been written on the subject during the war, we will briefly relate some of these cases, that the reader may draw his own inference as to what they teach. There is no more difficult point to decide in practice than the extent to which surgical interference shall go in the treatment of similar cases.

CASE I. Lewis Duball, private Co. K, 12th Maine, æt. 21, was wounded¹ on the 19th October, 1864, and admitted on the 23d to the Satterlee U. S. General Hospital.¹ We saw this patient for the first time on the 10th November. Until then he had been kept quiet, and upon low diet with water dressings to the scalp. He was comatose, and the right upper extremity was paralyzed. There was a gunshot wound about the middle of the left frontal bone, which was fractured, the fracture being about four inches in length, and running directly backwards; the edges of bone were depressed, and there were several small pieces lying loose between them. The loose pieces of bone were removed, and the depressed portions elevated. The dura mater was found intact. The man improved at once, so that five days afterwards he was walking about the ward entirely free from any symptom of nervous disorder. His recovery was perfect.

CASE II. Riverius H. Trask, private Co. H, 114th N. Y. Vols., æt. 23, was admitted from Sandy Hook Hospital, Maryland, September 25th, 1864, with a gunshot wound of the head received in the battle of Winchester, Virginia, September 19th. He said he had been slightly stunned by the blow; his mind was confused, and his articulation difficult. The ball had passed antero-posteriorly over the left frontal protuberance, producing a seemingly slight flesh wound about half an inch wide and one inch long. The man's general health was good, and the wound looked healthy. He complained, however, of a dull heavy pain just over the left brow, and the pupils of the eyes appeared to be rather dilated. Ordered to keep quiet, on low diet, with water dressings to the wound. September 26th, pain more severe, and pupils more dilated. On the 27th, the man had a severe epileptic fit, that lasted about forty-five minutes; and remained afterwards in a state of semi-consciousness, with a pulse full, regular, and very slow; pupils much dilated; and for two hours after the convulsion the respiration was stertorous.

On the following day an anæsthetic was administered,² and a free crucial incision of the scalp over the wound, then almost cicatrized, was made. A well-marked depressed fracture of the bone was found. By the elevator, about one and a half square inches of the outer table were removed. The inner table was then found to be fissured, and nearly the same amount of it was taken away. The dura mater was found greatly congested. On recovering from the effects of the anæsthetic, the man seemed to breathe more freely, and said that he had less pain than before the operation. Two teaspoonfuls of the solution of morphia were given, and repeated in two hours, so that he remained perfectly quiet; no food whatever was

¹ To avoid repetition, we will state that all the cases here related or referred to were observed in this hospital.

² For this purpose a mixture of sulphuric ether (three parts) and of chloroform (one part) was always employed.

allowed for the first day, and for twelve days he was not permitted to have any other nourishment than the essence of beef. On account of an attack of erysipelas of the head and face, that began on the fourth day of the operation and lasted for about one week, the tincture of the chloride of iron was administered freely for several days. On the 11th October, some light food was allowed in addition to the essence of beef; and on the 20th, he was placed on full diet. By the middle of November, the wound—the edges of which we made no attempt to bring together—had closed, and the man was perfectly well.

CASE III. Herman L. Page, corporal Co. K, 1st Mass. Artillery, æt. 20 years. Was wounded at Petersburg, June 17, 1864, by a ball (minié, in all probability) which struck the head at a tangent, about the posterior internal portion of the left parietal bone. At the bottom of the wound in the scalp, which was about two inches in length, the bone was denuded of periosteum, and several small bits of lead were tightly fixed in its small irregularities. The wound was healthy, and the man appeared perfectly well in all respects, when he was found speechless and paralyzed in his bed in the morning of the 3d July. By means of the trepan, on the same day, the outer table of the part of the cranium denuded of periosteum was removed; no fissure was found in it, and the diploe seemed healthy. Some improvement in the motions of the tongue was supposed to be witnessed, and further proceedings were postponed. Purgation by croton oil was practised. The next day, the 4th, the man being in the same condition, the trepan was applied to the inner table, a fissure, oval shaped, one inch in the long by half an inch in the short diameter, was then discovered. This fissure would not admit of the introduction of a finely pointed quill tooth-pick, and the bone was not loosened or depressed. This bony portion was removed, and beneath it the dura mater was found highly congested. A purulent collection was feared underneath this place; but it was judged most prudent not to incise the cerebral membranes. The man died at 4 A. M. of the 7th July.

At the autopsy, a large abscess was found, filled with fetid pus, extending from the top of the left cerebral hemisphere to its base.

CASE IV. William H. Burger, sergeant in Co. K, 47th Pa. Vols., was admitted Oct. 25, 1864, from Regimental Hospital, with a transverse scalp wound one and a half inch in length, on the left side of the head, over the frontal bone, near the coronal suture and the junction of the left frontal and parietal bones. The wound, said by the man to be from a piece of shell, was received at Cedar Creek, Virginia, October 19th. The bone was denuded of periosteum the whole length of the wound; no fracture was discovered. The man complained very little; the wound was healthy; there was diarrhœa for several days after admission. The right side became partially paralyzed; the pupils became dilated; on the 27th the man had a slight chill; his feces were discharged involuntarily; the paralysis increased; on the 28th there was a severe chill; he died on the 5th November.

At the *post-mortem* examination, on removing the scalp the portion of bone underneath the wound presented a dull white appearance. The external table was fissured on the left side of the longitudinal sinus; the fissure running across the sinus about a quarter inch, and separating the sagittal suture in its passage. On removing the calvarium a fissure with a depression of the internal table was discovered just to the left of the longitudinal sinus. The vessels of the membranes of the brain were much congested, and some pus was found on the surface of the dura mater. The

dura mater itself presented a dark, almost gangrenous, appearance. Under the dura mater, immediately beneath the wound, was found a large abscess involving nearly one-half of the left cerebral hemisphere, extending nearly to the left lateral ventricle. The remaining half of the right lateral ventricle was much softened by the infiltration of serum. In the posterior base of the right lateral ventricle was found a small quantity of pus.

Our experience, then, in injuries of the head, and this is true of civil as well as military practice, would lead us to adopt a different course from what we usually find advised by modern surgical writers.

To turn to the book before us, Dr. Hamilton believes that the patient's chances of recovery are better if left alone than if we proceed to operate (p. 237), and he says that "in trephining, sufficient additional injury is often caused to turn the balance in the scale against recovery" (p. 238). Several original cases of gunshot injuries to the head are given "to illustrate how much nature can accomplish under the most unfavourable circumstances, without aid from the surgeon." In one of injury (at page 242) at the back part of the occipital bone, the man was walking about and feeling well on the 24th day when Dr. H. saw him. In another (same page) where the skull was fractured and depressed—we are not told in what place—the man was improving rapidly, after having had delirium and convulsions, at the expiration of four weeks. That such cases signify nothing, however, from the short time they were under observation, may be learned from others afterwards related by Dr. H. himself. There are two of penetrating gunshot wounds of the head at page 244; in one no cerebral symptoms manifested themselves until about seven weeks after the receipt of the injury, and at the end of eight the man died from the formation of abscess in the anterior lobes of the brain. In the other during the first eight weeks no cerebral symptoms were present, and at the expiration of ten the man was dead.

Before leaving this subject of gunshot injuries of the head, we will relate a case of at least temporary recovery, where the ball entered the cavity of the cranium, as an interesting surgical curiosity, and also with the hope of being enabled thereby to hear its eventual termination.

George Guptill, private, Co. K, 29th Maine, æt. 24. Admitted Oct. 23, 1864. He was wounded on the 19th, at Cedar Creek, Virginia. The ball passed through the upper lid of the left eye, which was destroyed, and penetrated the orbital plate of the frontal bone. Several pieces of the orbital plate that were loose were removed. The man was kept on his back on a rigid diet, in a dark room, with cold-water dressings over the wound. No attempt was made to find the ball further than by the introduction of the finger into the wound. The pulse was decidedly *cerebral*, slow and irregular.

The man had an attack of erysipelas during the first ten days after the receipt of the injury. For several days about the beginning of November he complained greatly of pain and twitching of the muscles in the feet. Occasionally he had headache. On the 20th November he was allowed to sit up for the first time. On the 7th January, the wound, which had been kept open as long as any discharge issued, had closed, and he was discharged apparently well a few days afterwards.

Of what we have seen of injuries to the spinal column and its contents we have nothing to say, from our own observation, but what would be altogether superfluous after the excellent article of Dr. Lidell, published in the number of this journal for October 1864. In the work before us in

the chapter on gunshot wounds of the abdomen, there is about one page occupied with injuries of the vertebræ, and no more is said on the subject in the whole work. The remaining portions of the nervous system are passed over without any mention whatever, although the late Surgeon General considered them of sufficient importance to assign a special hospital for their study.

The injuries of the bones, caused by balls, are those of all others whose final result has most grievously disappointed all our calculations. The effect of a slight touch upon one of the bones of the cranium from a glancing shot is seen in some cases related above. We have again and again seen a stout fellow sink when one of the long bones had been touched so slightly as merely to carry off a small piece of periosteum. When this happened in the femur death *always* followed. As a paper upon gunshot contusion of bone has been promised, as a contribution to this journal, by one more competent than we are to treat of it, we shall satisfy ourselves with this short reference to the subject. Should such cases again fall under our care, we shall proceed at once to trepan the bone at the seat of injury. Of such injuries no mention is made by Dr. Hamilton; and he is equally silent about osteo-myelitis, which is even more astonishing, for it is a subject to which particular attention has been called, and upon which a great deal has been written in late years. The paper recently published in this journal by Dr. Allen may here be cited as one of special value on this most distressing complication of gunshot wounds. When the stump of an amputated limb suffers from this affection, we have repeatedly verified the correctness of the advice recently given by Mr. Longmore, namely, that it is better to wait for the elimination of the portions of bone that are to die, than to amputate at the joint above. In one case where the left femur, or what was left of it, was thus affected, nearly two years elapsed before the stump had perfectly healed.

In cases of gunshot wounds where the bones are broken, either into the joint or not, whether of the upper or of the lower extremity, we have failed to see, as we had hoped to do, that resection may be substituted for amputation, as exposing life to less danger, or securing a more useful limb. If amputation be not performed, we are satisfied that the surgeon should simply remove loose splinters of bone, and also those but slightly adherent, and then apply an apparatus to keep the parts as quiet and in as good position as possible. Resections, as a class of operations, have failed in military surgery. There is a long chapter in the work before us entitled Exsections, but it is only calculated to give information to the student of operative surgery. The same remark applies almost equally well to the chapter headed "Amputations." It contains, it is true, some considerations upon the conditions of the limb in army practice demanding amputation, the point at which amputation is to be made, the method, and the period of time at which it ought to be made; but those considerations contain nothing new, and they have been far better treated by other writers. Let any one, for example, compare those upon the conditions of the limb that demand amputation, with the indications given by Stromeyer. Upon this subject, again, we are able to refer to an admirable paper by Dr. Lidell, published in the April number of this journal. By no other writer has the proper time for performing amputation been so satisfactorily discussed.

On the subject of gunshot wounds of arteries we are, once again, so fortunate as to have a paper of Dr. Lidell (see this journal for January, 1864) to refer to. Upon one point only we cannot agree with him, and that is

the expediency of abstaining from performing any operation upon a wounded artery for hemorrhage unless it bleed at the time. This is the course he prefers, for the reason given that it frequently happens, even in apparently unpromising cases, that a hemorrhage stopped spontaneously or by simple means does not return (*loc. cit.*, page 115). This is also, as we know, the advice given by Guthrie. We have too often been deceived, ourselves, in the hope of seeing the bleeding stop, to have confidence in this. Besides, as Legouest says, hemorrhage kills not only by loss of blood but also by the anguish and dread it excites. It is a most pitiable sight to see men awaiting in fear an accident whose gravity they know instinctively. Dr. Lidell says that "to ligate the artery in such a case would be to inflict unnecessary torture upon the sufferer." In this we think him to be mistaken. We have always seen the man under these circumstances most desirous of undergoing the operation, and highly gratified when it had been accomplished. As to the torture of the operation itself, the use of an anæsthetic puts this out of the question.

We here finish our brief and somewhat hasty remarks on some of the most prominent points in the surgery of war, in which the whole profession in this country has, for several years, been deeply interested. What we have seen and done ourselves, it should be stated, was in a hospital in this city, and not in the field, not at City Point, nor at Washington. In other words, it was for the most part only the remote waves of the distant storm that we saw, and from which we made our observations.

We have already, from several references to the book before us, by Dr. Hamilton, said enough to show that we have found it to be in several respects defective and incomplete. Some of those subjects, which are of the highest and most special importance to the army surgeon, are altogether omitted. In addition to some already mentioned may be cited nostalgia, sunstroke, congelations, and even pyæmia.

As a general rule, original cases, for which we looked with some expectation, are, throughout the book, of such a character, from incompleteness, as to be quite valueless. Some examples of this were given when speaking of wounds of the head, and there are others equally remarkable elsewhere. Of what value, for example, are such cases as these, taken from the chapter on Gunshot Wounds of the Thorax.

"Isaac Etchell, a private in the 72d Penna., was wounded at Antietam, on the 17th of Sept., 1862, by a round ball, which entered the left side of the chest in front, three inches above and to the left of the nipple, passing completely through. He expectorated blood immediately and freely, but it soon ceased and never recurred. On the twenty-fourth day the wound had closed, and he was sitting up, but he continued to suffer from pain and a sense of oppression over the whole of the left side. Having never seen him since, we are unable to state the final result."

"Moses Haseltine, a private in the 12th Mass., was wounded at Antietam by a ball which entered the thorax two inches outside of the left nipple, and passed entirely through the body. He expectorated blood within ten minutes, and continued to do so for nine or ten days. Air had escaped through the wound in the back. Suppuration was free on the twenty-third day; he had considerable cough, and was looking thin and pale."

To be told that twenty or thirty days after being shot in the thorax a man suffered pain and had a sense of oppression, or had considerable cough, and was looking thin and pale, does not inform us even as to the then present condition of the parts in the thoracic cavity, which auscultation and percussion would have done. Still less does it throw any light

upon their final termination, and this in these cases requires elucidation. Although we have treated a large number, and had many under our care for many months, we feel ourselves as yet quite in the dark as to the final results in gunshot wounds of the thorax.

In concluding this review, it may not seem out of place to give expression to our feeling of deep regret that the able and highly intelligent surgeon, who had collected with indefatigable industry so many valuable materials for the surgical history of our war, and who had made great progress towards the completion of the work, has not had the privilege afforded him of finishing his task. Had this been done, the profession could look with greater confidence for a full account of what medicine has done in its bloody fields and crowded hospitals, sure that, so far as we are concerned, it should not be said of this dreadful war, *caruit vate sacro*. W. F. A.

ART. XVIII.—*Lectures on Epilepsy, Pain, Paralysis, and certain other Disorders of the Nervous System, delivered at the Royal College of Physicians in London.* By CHARLES BLAND RADCLIFFE, M. D., Fellow of the Royal College of Physicians in London, Physician to the Westminster Hospital, &c. London: John Churchill & Sons, 1864.

A PHYSICAL theory of innervation and muscular action must, if established, be a grand advance in physiology. If its application to pathology and therapeutics be direct, and, most of all, if it tend to cause a revolution in practice, such a theory must have great importance. Has Dr. Radcliffe furnished us, in the work entitled as above, with this desideratum? Not without some sympathetic enthusiasm for the inquiry, excited by his own manifest though intelligent zeal, we have endeavoured to do justice to this question, by a careful study of the work. If our conclusion be not such as to satisfy either its author or our readers, it will not be from want of attentive consideration of the argument.

Twelve years sooner, as Dr. Radcliffe states in his preface, he published an essay on the "Philosophy of Vital Motion;" and afterwards other volumes, in which he endeavoured to show that it was necessary to revise the current theory of muscular motion, and to consider muscular contraction as "a physical process in which the attractive force inherent in the physical constitution of the muscular molecules was the contractile agent;" and, in consequence, that a radical change was called for in the pathology and therapeutics of convulsion, tremor, and spasm. Since the last of these works was printed, he has found occasion to add further evidence in favour of his doctrine, and to extend its application to the physiology of sensation, and the therapeutics of pain and paralysis.

In the essential idea upon which he starts in all of these investigations, others had anticipated him to some extent. Dr. West, of Alford, as mentioned in Dr. Radcliffe's appendix, maintained distinctly, in 1832, that "the nervous influence present in relaxed muscular fibre is the only influence which the nerves of volition possess over that tissue; that its office is to restrain or control the tendency to contract which is inherent in the muscle:

¹ Epileptic and other Convulsive Affections of the Nervous System, and their Treatment. Incorporating the Gulstonian Lectures for 1860.

and that contraction can only take place when by an act of the will this influence is suspended, the muscle being then left to act according to its own innate properties." A little later, Sir Charles Bell is said to have *hinted* at a similar idea in one of his lectures, although premising an expectation that "the question could never be settled." Dugés of Montpellier, Matteucci, Engel of Vienna, and Stannius of Rostock, are also quoted as advocating more fully a hypothesis of the same kind.

Our author's clear language may be best used to indicate what the facts and arguments of his lectures are designed to antagonize.

"With respect to muscular action, the current doctrine is, that muscle is endowed with a vital property of contractility; that muscular contraction is the sign of vital excitement in this property; that excessive muscular contraction, whether voluntary or involuntary, betokens excessive vital excitement in this property, and that the treatment required in order to subdue convulsion, or any disorder analogous to convulsion, is one which is calculated to quiet excessive vital excitement. What I hope to do is, to show that the facts, old and new, but particularly those which have been brought to light during the last fifteen or twenty years, necessitate a very different doctrine, and a not less different practice. With respect to sensation, the current doctrine is, that certain kinds of nerve-tissue are endowed with a vital property of sensibility, that sensation is the sign of vital excitement in this property, that pain, or any sensation analogous to pain denotes excessive vital excitement, and that the treatment of pain and sensations analogous to pain must be ruled according to this view, the proper means being those which are calculated to subdue vital excitement. What I hope to do is to show that the change in doctrine and practice which is demanded in the case of disordered muscular action is also demanded in the case of disordered sensation." (pp. 2, 3.)

First, then, the physiology of muscular motion is considered. Regarding animal electricity as essentially connected with this, our author gives a preliminary sketch of the successive discoveries of Galvani, Volta, Humboldt, Aldini, Nobili, Matteucci, and Dubois-Reymond upon that subject; whose importance is indicated by words cited from Humboldt, "*La physiologie doit à Galvani et à Harvey ses deux bases principales.*" The joint labours of Matteucci and Dubois-Reymond have left no room for entertaining any doubt as to the reality of animal electricity. Matteucci has demonstrated its power to decompose iodide of potassium, and to affect the condenser and galvanometer, and has shown that muscular contraction is accompanied by an electrical discharge, analogous to that of the torpedo. Dubois-Reymond's discoveries go far into detail in regard to the electrical currents in nerve and muscle in different kinds of animals.

Dr. Radcliffe's first proposition is one of those established by the observations of the last named investigator; that "during inaction the natural state of living muscle and nerve is one in which the longitudinal and transverse surfaces of the fibres are in a state of electrical antagonism, the longitudinal surfaces being electrified positively, and the transverse surfaces negatively." In an electrical point of view, there is stated to be no difference whatever between nerve and muscular fibre, or between different kinds of muscular fibre, or of nerve fibre.

To explain this electrical antagonism between the surfaces, Dubois-Reymond proposes one hypothesis, and our author another, as to the molecular arrangement and polarity of muscle and nerve; the same for both. These different views cannot well be made intelligible without the diagrams given in Dr. Radcliffe's book. Why the molecules, or fibres composed of them, should preserve their particular electrical arrangement, is a problem yet unsolved.

Further, under certain circumstances the electrical relations between the longitudinal and transverse surfaces of muscle or nerve may be *reversed*; the longitudinal becoming negative, the transverse positive. This may happen just before rigor mortis in some animals, in the muscles; and in nerves after various injuries. In an isolated limb of a frog, contact of a hot iron with the nerve will cause it. Dr. Radcliffe asserts that—

“The vital properties of the nerve are not materially affected so long as the reversal lasts; the muscles of the leg may very readily be thrown into a state of contraction by acting upon the nerve, while the needle of the galvanometer shows very plainly that the natural electrical relations of the longitudinal and transverse surfaces are reversed.” (p. 26.)

Very distinct statement and illustration follow of other propositions. We have space for some of them only. During the state of inaction living animal tissues furnish signs of natural electricity of high tension. One of the most remarkable experiments upon this point is that of Humboldt; in which the spontaneous animal electricity (as he regarded it) was made to traverse a gap between the ends of a divided nerve to the extent of four-fifths of a line. Muscles *lose* their “natural electricity” in *rigor mortis*, at the same time that they lose their irritability.

Contrary to views elsewhere previously expressed by him, Dr. Radcliffe now believes that the primary electrical condition of living muscle and nerve during inaction, is that of statical electricity; the “muscular current” and “nerve current” being only secondary phenomena. Dubois-Reymond, however, thinks that strong currents circulate in closed circuits around each one of his peripolar molecules.

Now it appears to us, however abrupt the statement of this opinion may appear just here, that these decided differences, upon such a point, show how *purely hypothetical* very much of the foundation of this “theory of nerve and muscular action” is. The language of Dr. Radcliffe’s next two propositions confirms this view. “It is possible,” he says, that the elongated state of the fibres of living muscle may be due to the presence of the electricity which is inherent in them during the state of inaction. “It is possible” that the state of the muscular fibre in rigor mortis may be the necessary consequence of the extinction of the natural electricity of the fibre. Were these possibilities, and others consequent upon them, made certain, a physiological law would be founded, instead of a plausible conjecture.

Action in motor nerve and muscle are, in our author’s second lecture, similarly studied. “The state of action in a muscle is accompanied by a discharge of electricity analogous to that of a torpedo.” This is the starting proposition. Matteucci devised the experiment which proves it. A frog’s leg, skinned, with all parts of the thigh cut away except the principal nerve, has this nerve laid upon the muscles of another leg prepared in exactly the same manner. When the nerve of the *latter* is pinched, “induced contractions” take place in the muscles of the former. Of course the force causing these secondary contractions has been communicated from the muscles of the limb acted upon. That it is *electrical* force is shown, further, by interposing small pieces of moistened lamp-cotton between the nerve of the one limb and the muscles of the other; when the same result will occur as before. That it is “analogous to the discharge of the torpedo” is inferred “from sundry obvious analogies between the anatomy and physiology of the muscular system and the anatomy and physiology of the electric system.” (p. 42.)

Those analogies are close, undoubtedly. But, as Dr. Radcliffe afterwards finds a good deal upon this proposition, let us scrutinize it a little. What is proved should be carefully separated, in such an inquiry, from what is merely possible; a mere analogy, from identity. Observe, then, how *artificial* all the circumstances are under which the experiment is performed. Brevity requires us simply to ask, is *every* muscular action, in a living animal, accompanied by a "discharge analogous to that of the torpedo?" Can it be so, when we know that, although nerves and muscles lie packed together in all the limbs and other parts of the body, a few fibres, or the largest muscle, may act *alone*, with no "induced contractions" at all? May not the result described be merely pathological (traumatic); like so many of the complicated results of vivisection?

Further; in another part of the volume, this experiment and conclusion are made important parts of an argument to show that the relation between muscle (as well as nerve) in action, and electricity, is, a *loss* of electricity as the *cause* of the action; the natural electricity of the muscle maintaining its *dilatation*. Yet, in the experiment above, and in the corresponding one next mentioned in the book, where the nerve of one limb touches the nerve instead of the muscle of the other, the electricity discharged by the one limb is *received* by the other; and produces in it *not dilatation*, but *contraction*; the only *proof* of the "discharge" being the contraction so induced. Is not this enough to show that no very essential inference should, as yet, be drawn from this experiment?

Next, we have (p. 45) the proposition, most important, perhaps, of all, that "the natural electricity present in living muscle during the state of inaction is almost or altogether absent in the state of action." The same statement, precisely, is made in regard to the inaction and action of motor nerve; founded, in both cases, on galvanometric experiments.

"M. Dubois-Reymond does not speak of this disappearance of electricity from the muscle, during the state of action, as a *discharge*. Indeed, he has his thoughts fully occupied with the idea of current electricity, and he ignores altogether the evidence of discharge which has been supplied by M. Matteucci. As it seems to me, however, M. Dubois-Reymond supplies the very proof which M. Matteucci requires to supplement his discovery; for in the case in which M. Matteucci infers the existence of electrical *discharge*, M. Dubois-Reymond shows that there is an actual *disappearance* of electricity." (p. 47.)

We have looked through the volume to find some allusion, in connection with this "disappearance of electricity" (which is said also (p. 124) to attend voluntary muscular action), to the theory of the transmutation of electrical into mechanical contractile force, so familiar to many physiologists since the publication of Grove's inquiries. It is found on page 132 of Dr. Radcliffe's book; and is by him very briefly disposed of as a "notion," which seems to him not in harmony with the history of *rigor mortis*; as, to his view, "the explanation, which will apply to ordinary muscular contraction, as well as to rigor mortis, is surely to be preferred to that explanation, which, at best, can only apply to ordinary muscular contraction." To this, we must say, "*non sequitur*." It involves an assumption, open to very great doubt, that rigor mortis and common contraction of living muscle are phenomena of one category, with one explanation. Nor is it at all impossible to account, hypothetically, for rigor mortis, in consistency at least with the theory of "conversion of force." The neglect of this theory, indeed, appears to us the weakest point in Dr. Radcliffe's book.

It would be improper to detain the reader with the minutiae of the argu-

ment, as very clearly given by our author. His style is certainly a model of lucidity and precision. It would be injustice to attempt to condense his matter into less compass than that of his own pages, since that could only be accomplished by omission of important points. Mere reference to the most prominent difficulties presented must suffice us.

After establishing that "a motor nerve which has lost its natural electricity has also lost its irritability," some very curious effects are shown, as connected with the inclusion of a nerve between the poles of a galvanic circuit, according to the relative position of the positive and negative poles. Using for a time the common terms of "direct and inverse," or "centrifugal and centripetal currents," he afterwards speaks, in a manner less easily reconciled with prevalent views of electrodynamics, of "the action of *each pole, singly*, upon the nerve." We must confess to an inability to find either necessity or advantage in this employment of terms, over that of those which ascribe stimulation and paralysis, respectively, of a nerve, under the circumstances mentioned, to *current* action, either with or adverse to the polarity of the nerve-trunk itself. Either set of expressions is obviously consistent with the conclusion given (p. 75), that all these results "appear to be the natural consequences of the reaction which must take place between the artificial electricity on the one hand and the natural electricity on the other."

The influence of the blood upon the activity of muscles, nerve-centres, and nerves is the first topic entered upon in Dr. Radcliffe's third lecture. It is said, and proved by experiments by Brown-Séquard and Stannius, not only that rigor mortis is associated with stagnation and coagulation of the blood, but that muscles which have passed into the state of rigor mortis will return into the state of vital relaxation if their muscles be supplied with a sufficient amount of blood. The experiments, fully described, are decisive.

Next he asserts that "increased disposition to ordinary muscular contraction appears to be associated with diminished supply of blood to the muscular system." (p. 84.) All the facts mentioned on this point are such as show greater "irritability" of the muscles in animals (reptiles and fishes) whose blood is least arterialized, and in hibernating mammals than in the same at other times, and in a warm-blooded animal whose circulation was depressed to the reptilian standard by division of the cervical portion of the spinal cord. Two propositions follow which are generally admitted, that "general convulsion is brought about by sudden hemorrhage," and also "by suddenly arresting the arterialization of the blood," as by suffocation.

Harley's experiments are adduced to show further that air left in contact with blood to which strychnia or brucia has been added contains more oxygen and less carbonic acid than air left in contact with simple blood. Our author infers that "one way in which strychnia or brucia brings about spasmodic muscular contraction is by producing a change in the blood which is equivalent to loss of arterial blood." (p. 87.) He concludes also, very reasonably, we consider, that the influence of venous blood in the process of muscular motion is "equivalent to the absence of arterial blood" solely, instead of the carbonic acid contained in it being, as Dr. Brown-Séquard has urged, a direct stimulus to muscular action.

In some pages which follow, an almost sophistical confounding occurs, it seems to us, of *convulsive* action with "ordinary muscular contraction." No experiments illustrating to any considerable extent the process of normal voluntary motion are described; but whatever is shown to be true of rigor

mortis, or convulsive or spasmodic (all, of course, morbid or pathological) muscular action, is taken for granted to be as true of all "ordinary muscular action." This should *not* be granted without proof; it does not have *a priori* probability. As to convulsion, spasm, and tremor, there need be no hesitation in admitting that "in the most exaggerated form" they may and do occur when "the amount of nervous influence supplied by the nervous centres to the muscles must be at or near zero." All the pathological conclusions of our author may be accepted and regarded of importance, without involving the sweeping physiological generalizations his terms require. Can voluntary muscular activity go on when nervous influence is at zero? or when the muscles are deprived of arterial blood? Our author's words sometimes negative these questions; as when he says that "a muscle left to itself is in a state of dilatation," and that "the functional activity of any organ is in proportion to its supply of arterial blood." We have, too, an experiment narrated (p. 98) in which there is "paralysis in the parts from which the blood is excluded, paralysis almost everywhere, convulsion nowhere."

It is needful for us to pass over many interesting pages, whose topics are so intricate that one must give them careful study to apprehend their bearing. The *controlling* influence of the brain, and probably medulla oblongata, in preventing morbid excito-motor disturbance under peripheral nervous irritation, is somewhat under-stated, although mentioned.

The "physical theory of muscular action" adopted by Dr. Radcliffe is expressed summarily as follows (p. 110):—

"When a muscle is made to contract by means of its nerve, there is reason to believe that the electrical discharge (analogous to the torpedo) which accompanies nervous action has reversed the electrical relations of the exterior and interior of the muscular fibres in the part acted upon; that this reversal has led to the discharge of the electricity which is present in the muscular fibres during the time of rest, and which keeps these fibres in a state of relaxation so long as it is present; and that this discharge of electricity brings about muscular contraction by leaving the muscle free to yield to the action of the attractive force which is inherent in the physical constitution of the muscular molecules."

On this we must remark, further, that our author has proved (p. 26) that while the needle of the galvanometer shows that the natural electrical relations of the longitudinal and transverse surfaces of a nerve are reversed, the muscles of the limb experimented upon may be "thrown into a state of contraction by acting upon the nerve." That is, the reversal being for the time persistent, contraction may be otherwise produced and intermitted; of course, therefore, the one cannot depend upon the other.

Moreover, no explanation of the *source* of the electricity natural to muscle as well as nerve is given with this theory; the cause of the polarity or statical repulsion of the molecules in dilated muscle is not suggested. We have, then, for those molecules, two sorts of attributes assumed: 1st, an *electrical repulsion*, owing to the arrangement of the particles, they being alternately positive and negative; 2d, a *tendency to attract each other*, owing to their *physical constitution*. Is not this less simple, after all, and less satisfactory, than the supposition that dilatation of muscular fibre is owing to the elasticity which it has in common with several other tissues, and that contraction is due to attractive force developed in the molecules in the direction of the length of the fibre, whether it be by the conversion of electrical into mechanically contractile force or not? We are not wedded to this theory, but simply fail to find demonstrative reason for

preferring the one above proposed instead of it. Dr. Radcliffe remarks himself that one objection to it is that *nerves* ought to contract in their length, as well as muscles, under the same reversal of the electrical relations of their surfaces which is observed to occur. Unable to obtain any instance of nerves so contracting, he is obliged to be contented with supposing it *possible* during life, and with the conjecture that the beaded appearance of nerves after death is of that nature. This does not seem to us to solve the objection.

Nor can we find that an actual advance is made by our author's reasoning upon the subject of rhythmical muscular motion, whose alternations he makes to depend on electrical reversals in ganglia, whose condition is again affected by the injection of arterial blood, and its becoming venous, successively. As a hypothesis it may do, but no better than other hypotheses.

It is certainly claiming too much to assert that such views explain "capillary force." While Dr. Radcliffe is no doubt right in considering that a force resides in the vessels (arteries) contributing to the circulation, this yet leaves over a force of a different nature, acting in the capillary region, analogous to that moving the sap in plants.

Much more might be said upon the very similar views set forth on the physiology of sensation. But, as the facts and arguments are parallel, nearly the same remarks would apply.

It is satisfactory to be able to speak with more unqualified approbation of most of the pathological discussions and conclusions of our author.

Of epileptic, epileptiform, and hysterical conclusions it is, on the basis of facts, asserted that they are "connected with depressed and not with exalted vitality." The signs of this condition are derived from the respiration and circulation, both during and between the paroxysms.

One incidental proposition admits of question (p. 184):—

"At the height of the epileptic or epileptiform paroxysm the pulse is usually full, strong, and frequent, because the arteries are then labouring under a load of *black* blood, as they are found to labour in suffocation, and not because these vessels are then receiving an increased supply of *red* blood."

We must doubt the dependence of the character of the pulse in this case, or in suffocation, upon *either* the venous or the arterial condition of the blood. Experiments of Dr. J. Reid, of Aberdeen, and Prof. Draper, the younger, of New York, are referred to as to the state of things in suffocation. The pulse was found, by the hæmadynamometer, to increase greatly after the windpipe had been tied. The *apnæal* pulse, therefore, Dr. Radcliffe infers, is the *pulse of black blood*. But Dr. Draper found blood accumulating, during suffocation, in the aorta. Might not obstruction, *resistance*, increase the hæmadynamometric pressure to the degree observed?

It is correctly stated that convulsion never coincides with a state of active febrile excitement. Dr. Radcliffe also avers that there is no clinical evidence to show that, in convulsion, there is an over-active circulation in the brain. Nor are *post-mortem* appearances thought to conflict with this view. Schröder Van Der Kolk's observations of the large dilatation, with thickening of the walls of the bloodvessels of the medulla oblongata in epileptics is the most open to different interpretation upon this point. Congestion of the cerebral veins has, likewise, been shown not to be associated in causation with convulsions.

Therapeutical deductions of great interest are drawn from these facts; and it is on account of these especially that attention was called to Dr. Radcliffe's previous volume upon the same subject. He argues, with con-

siderable force, backing his reasoning with clinical facts, against purging and low diet in epilepsy, and in favour of cod-liver oil, phosphorus, and fatty food; in commendation, too, of regulated gymnastic exercises; against belladonna and zinc, and for bromide of potassium, and alcoholic regimen. Sir Charles Locock is lauded for the introduction of the bromide of potassium in the treatment of epilepsy, as opening at once "a brighter future for the fortunes of epileptics." While experiments upon animals, and some clinical observations, give reason to ascribe to it narcotic and anæsthetic properties, the exact rationale of its action in epilepsy is not determined.

Phosphorus Dr. Radcliffe has used in the form of a mixture of the ethereal tincture of phosphorus of the French Codex, mixed (f3j in f3ij) with sulphuric ether; his dose of this preparation being half a fluidrachm or a drachm mixed with water.

Against belladonna he urges that its causing dilatation of the pupil is a contra-indication in epilepsy. This dilatation, he considers, "there is reason to believe," results from the belladonna producing an *anæmic* condition of the brain; the size of the iris depending, when in a state of rest, in great measure upon the fulness or emptiness of its bloodvessels. In epilepsy, therefore, where our author's theory requires the supposition of an anæmic tendency in the cerebral circulation, this action would be undesirable. Without having anything at all to urge in favour of the use of belladonna in epilepsy, and, at the same time, without being able to disprove this explanation, we must consider it very doubtful.

Less than a page, in this work, is given to the topic of the use of alcohol in convulsive affections. This is positively favourable, however. These are his words: "There is reason to believe that alcoholic stimulants are very trustworthy antispasmodics in the prevention and treatment of convulsion." (p. 249.) In accepting the truth of this as a therapeutical proposition, great judgment must be called for in its application. Few modes of practice could do more harm if indiscreetly carried out. It is impossible to doubt, nevertheless, that facts abound to show that it contains a valuable and often practically applicable truth.

The general statement which is the most important result of all of Dr. Radcliffe's inquiries, and which may well stand, whatever may be thought of his purely physiological views, is thus expressed: "There is reason to believe that the therapeutics of convulsion must be based upon the notion that vital power has to be reinforced, and not upon the contrary notion."

The last two lectures are occupied with the subjects of tremor, spasm, pain, and paralysis. Similar pathological facts, in regard to tremor and spasm, to those already reviewed as to convulsions, justify the same conclusions upon their therapeutics. The indication is in both to exalt, not depress "vital tone." The absurdity of imagining that promiscuous stimulation can accomplish this is, of course, put aside by the familiar history of delirium tremens.

Pain is described by Dr. Radcliffe as being "either of a neuralgic character, or depending upon tenderness;" the latter being only accidental, the former essential. Inflammation, he considers to produce pain "accidentally," by pressure of the swelling upon tender parts. Such a line of distinction, as our author observes, must be broken in some parts. Is it not too often broken to be descriptive at all? Which category will receive the pain of cancer; of chronic rheumatism; of the pains designated by Inman as *myalgia*? Here, again, we are most satisfied with Dr. Radcliffe's clinical and pathological generalizations. Neuralgic pain, is, as

he states, apt to be associated with a deeply depressed condition of the circulation; and to be antagonized by hyperæmic excitement. Sydenham and Garrod are quoted as giving data for the extension of this account to the severe pain of gout; and facts are given of the same purport in regard to other forms of pain apparently connected with an inflamed condition of the part.

Besides confirming theoretically some common therapeutical experience, our author infers further that "the diet best suited for the neuralgic habit of body appears to be one which does not contain too much lean meat and too little fatty and oily matter." (p. 311.) This follows from the physiological doctrine that oleaginous material abounds in all nerve-cells as an essential constituent. Dr. Radcliffe thinks that he has found practical exemplification of its truth. He also believes sugar in excess to be harmful to the neuralgic, by producing an excess of lactic acid in the blood. The properly regulated use of alcoholic drinks is recommended as an essential part of the preventive and curative treatment of neuralgic pain. (pp. 313-14.)

"I have no hesitation in saying that the proper use of alcoholic stimulants is at once the natural corrective of the neuralgic habit and the most trustworthy of all anodynes. I have repeatedly known a paroxysm of neuralgia prevented and cut short by a glass of hot grog, and the condition of the patient in other respects improved rather than damaged by the proceeding; and this is more than I could say of any other method of treatment; and I have too often seen the beneficial influence of rum and milk in the morning in correcting the neuralgic habit to have any room left for doubt upon this score."

Again, we say, this is a well-sustained principle of practice, but especially capable of abuse. There are some patients, at least to whom "rum and milk in the morning" would be more dangerous, though less distressing, than neuralgia. As to the decided preference expressed for coffee over tea as a daily beverage for the neuralgic, we cannot but indulge a good deal of doubt as to its justification.

Dr. Radcliffe's views in regard to the electrical condition of the system lead him to believe that it may be necessary to return to the original mode of using electricity as a therapeutical agent: for instance, by insulating the patient and charging him with positive electricity. As yet, his experience does not suffice to afford confident support to this opinion. A suggestion is further made that the induction-coil might be very beneficial in neuralgia, "provided only the operation be carried on long enough to bring about vascular reaction, long enough to bring on an artificial hot stage by paralyzing to a certain extent the vaso-motor nerves." (p. 321.) This must be looked upon as heroic practice; not without danger can it be to induce a "paralytic" condition other than the most transient anæsthesia, anywhere in the body. Dr. Radcliffe mentions having seen three cases which seem to give countenance to his notion.

In the pages devoted to paralysis, the most interesting point perhaps is the discussion of the significance of "early and late rigidity." In place of Dr. Todd's opinion that late rigidity is due to the shrinking of cicatrization producing a slow and lingering "irritation," Dr. Radcliffe considers it to be a sounder explanation that "late rigidity is the anticipation in the part of rigor mortis—*rigor mortis in vitâ*, and nothing less nor more." This view is plausible.

The use of electricity in paralysis is spoken of in terms similar to those already cited in reference to neuralgia. Here too the employment of "shocks of the coil-machine until the operation is followed by a sufficient

degree of vascular reaction" is recommended, with the intention of affecting the vaso-motor nerves of the centres involved. There is evidently reason to fear that such a course would be over-violent, rather promoting disorganization than nutrition.

Altogether, both to the physiologist and the physician, Dr. Radcliffe's book is one of great interest. In its practical facts especially it deserves careful attention; and in the whole discussion of the subject—often intricate—he has shown powers of analysis and elucidation, such as are rarely met with amongst medical writers. When unable to agree fully with him, every reader must concede that he has at least made it possible always to understand his statements and arguments; and thus, yet more advanced conclusions, in an important inquiry, are made more probable in the future.

H. H.

ART. XIX.—*Acupressure; a new Method of Arresting Surgical Hemorrhage, and of Accelerating the Healing of Wounds.* By JAMES Y. SIMPSON, M. D., F. R. S. E., Professor of Medicine in the University of Edinburgh, and Physician Accoucheur to the Queen for Scotland, &c. &c. &c. With illustrations. Demi-octavo, pp. 580. Edinburgh, 1864.

THE author of this work needs no formal introduction to the readers of this Journal. Everybody knows who Prof. James Y. Simpson is. His exalted position as an eloquent and erudite teacher, his obstetric and medical writings, his numerous contributions to the periodical press, his miscellaneous essays, and his discovery of chloroform as an anæsthetic agent, have secured for him a world-wide reputation, and made his name illustrious among men both in and out of the profession. His recent treatise on acupressure gives him fresh claims to the consideration, if not the gratitude of mankind. It affords additional proof, if any had been wanting, of the ever-active, restless, inquisitive state of a great mind, constantly in quest of new truths, and the development of new facts. It is not surprising that a man of such intellect and versatility, of such extraordinary mental gifts, as Prof. Simpson unquestionably possesses, should occasionally, like an erratic star, wander from his own more legitimate orb into the regions of another, to enrich it with new light. The case finds, singularly enough, its parallel in that of the great Paré, the illustrious inventor of the ligature, who, like the Scotch professor, was at once physician, surgeon, obstetrician, author, and reformer.

Acupressure, as a distinct hemostatic process, is a recent invention. The first account of it was communicated to the Royal Society of Edinburgh, at their meeting on the 19th of December, 1859. The paper was soon after published in the proceedings of that Society, as well as in the *Edinburgh Medical Journal*, the *London Medical Times*, and other prominent periodicals. The news of what professed to be so important an invention rapidly crossed the Atlantic, and attracted the attention of the great surgeons of this continent.

It is not our intention here to describe the operation of acupressure; to do so would evidently be out of place, as a sufficiently accurate account of it is to be found in every recent work on surgery; our chief business is with the treatise itself, and the actual progress of acupressure, as a hemostatic agent, and its probable ultimate fate.

The first thing that strikes one in perusing Dr. Simpson's treatise is its vast extent. We almost instinctively ask ourselves, How it is possible for a man to write so much upon so limited a subject? We feel as if we were floundering about in a vast sea, and yet it is impossible to read a dozen pages of the work without having one's attention completely absorbed in it. It possesses, in fact, all the charms of a romance. No one can read it without feeling that he is guided by the hand of a master. Its enchanting style, its varied learning, its earnest tone, impart to it a freshness and piquancy seldom equalled in medical writing. Its erudition is immense. Every writer of any note or consequence, from Hippocrates down to the present time, is laid under contribution. The author generally makes each tell his story in his own language, a mode of interrogation which adds greatly to the interest and value of the work. He constitutes himself, as it were, a judge at whose bar every surgeon, dead or living, has been compelled to deliver his testimony. The reader will find in this treatise more information upon the nature and treatment of wounds than in any other work extant. Had Prof. Simpson confined himself simply to acupressure, he might have exhausted the subject in one-tenth of the space; but it was impossible for a man of his mind to do this. Once fairly in the field, he found it of almost illimitable extent, and we may well imagine how reluctant he was, when, at length, he reached the last page of his book, to relinquish a task which must have afforded him so many pleasant hours of intercourse with scientific men.

The first practical application of acupressure was made soon after the announcement of the invention. Scotland supplied the first cases. They were principally cases of amputation of the leg and forearm. Very soon, however, the process was extended to the large vessels. Dr. Struthers, of Leith, was the first to apply it to the femoral artery in an amputation of the thigh. Up to the present moment, acupressure has perhaps been more frequently employed in Scotland than in any other part of Great Britain. Cases of it are occasionally reported in connection with the London and provincial hospitals, but they are comparatively few, and, from all that we can learn, the operation is not in special favour with English and Irish surgeons. On the continent of Europe—France, Italy, Germany, and Russia—acupressure is seldom performed as a means of arresting hemorrhage. A similar remark is applicable to our own country. The remedy, soon after its introduction among us, was seized upon with avidity by some of our leading surgeons. One gentleman, we know, applied it even in a case of amputation at the hip-joint, although not without misgivings as to its entire safety; for before he closed the wound he considered it his duty to resort to the ligature. We have not been able to learn that the operation has been much, if indeed, any, practised by our military surgeons who have enjoyed such unbounded opportunities of tying arteries during the present war. Our civilians generally give the preference to the ligature. One reason for this no doubt is that the ligature is so much more easily obtained than the acupressure needle, not to say anything of its much greater cheapness, although the latter consideration would probably not have much weight with any surgeon, however extensive his business. The author states, in his preface, that acupressure has been successfully applied in Asia and Australia. Dr. Davidson, of Antananarivo, Surgeon to the Royal Court of Madagascar, in a letter to a friend of Prof. Simpson, declares that he is so much pleased with this mode of arresting hemorrhage in amputation that he thinks he will never use ligatures again.

It is not a little surprising that the greatest opponent acupressure has yet met with, should be a colleague of the ingenious inventor himself. Prof. Syme has omitted no opportunity to disparage and even denounce it, and that not always in the most gentle phrase. These attacks have, as might have been supposed, provoked severe replies from Prof. Simpson, as may be seen in the *London Medical Times* and the *Lancet*; the communications are exceedingly pungent and well written, and marked by the raciness of style so peculiar to the author. It is hardly possible that Prof. Syme could fail to smart under them, and yet it is certainly his own fault if he is made to suffer. His conduct affords an apt illustration of the sentiment of Terence: "*Si mihi pergit quæ vult dicere, ea quæ non vult audiet.*" Steel is not the only substance that cuts. To assume, as seems to have been the case in the present instance, that nothing good can emanate from the brain of an obstetrician, was rather a bold conclusion, fraught with evil consequences. The surgical professor in the University of Edinburgh has never, it would seem, employed acupressure, and yet, according to our author, he has set himself up as its most uncompromising enemy. When, or how, this controversy may end, time alone can determine. It is much to be regretted that there should ever have been any occasion for it. Disputation too often distracts the profession, and curdles the milk of professional brotherhood.

The current of invention, of discovery, and improvement never runs smooth. There is always something to ruffle its surface; something to impede its progress, and, if possible, to divert it from its rightful channel. Persecution often advances a cause more rapidly than its own intrinsic merit. The blood of the martyrs was the seed of the church. The opposition received by Paré, in his attempt to introduce the ligature as a hemostatic agent, to the notice of the profession, forms one of the most thrillingly interesting, as well as one of the most humiliating, pages in the history of medicine. Mortification and chagrin met him at every step. His opponents soon assumed the character of unrelenting persecutors. No means were too foul for their purpose. Their efforts were unceasing. Paré had no rest by day or by night. Gourmelen, President of the College of Physicians of Paris, old, irritable, insolent, and conceited, would have burnt him at the stake, if he could have prevailed upon his sovereign to connive at so horrid a crime. Paré, through all this storm of opposition, stood firm at the helm; gradually, light burst in upon the profession, like the dim glimmer that meets the vision of the wearied traveller as he is about to emerge from a dense forest; and the seething iron, the boiling pitch, the hot turpentine, blue vitriol, and other means of torture were forced to yield to the silken cord. The victory was accomplished. God's purpose was fulfilled. "For the good of mankind," says Paré, "and the improvement and honour of surgery, I was inspired by God with this good thought." And a good thought it was, a thought which has saved more limbs and lives than any other improvement ever vouchsafed to surgery.

The spiteful, impudent manner in which Gourmelen denounced the innovation of the ligature may be gathered from the following extract from his work on surgery. Without deigning to mention Paré's name, he writes: "It was then very forward, rash, and presumptuous in a certain person to venture upon condemning the cauterizing of bleeding vessels—after cutting off a mortified limb—a method so highly and continually commended and approved of by all the ancients, teaching, in opposition to

that, without any authority, without knowledge, without experience, without good sense, some new method of his own, of tying arteries and veins." It is remarkable that the use of the ligature, as a means of arresting hemorrhage, was not generally accepted in Europe until near the middle of the last century.

The confidence of the author in the ultimate universal adoption of acupressure seems to be unbounded. Notwithstanding the opposition manifested to it in certain quarters, by men occupying high places, he declares, in a recent communication in the *Medical Times and Gazette*, that it has made greater progress, in obtaining professional favour, in four years than the ligature did in fifty. In the closing chapter of his work he boldly predicts that, although not a prophet, acupressure will, within the next two or three generations, completely supersede the use of the ligature as a means of arresting hemorrhage. Whether this is to be in its present or in some other modified form, he does not state. The ligature, at all events, is a doomed *institution* in the opinion of Professor Simpson; for, says he, if this revolution is not effected by acupressure, it may be by some other hemostatic means even still more safe and simple. "It is mere idleness and frivolity," he adds, "to argue, as has been lately and earnestly done, that no efforts should be made in this direction, because surgeons are generally quite content with the ligature, in despite of its evils, and have no wish to change." We sincerely wish we could share this belief of the distinguished author, amounting as it does, in his case, to a conviction; but we fear that his prediction will never be verified. That acupressure will gradually establish itself in the confidence of the profession as an important auxiliary in the treatment of surgical hemorrhage, is what we fully believe; but it would be unreasonable to suppose that it will ever entirely supersede the use of the present method—that good thought for which Ambrose Paré so devoutly thanked God for having inspired him with. There are many regions of the body where, owing to the peculiar relations of the vessels to the surrounding parts, acupressure cannot be employed with advantage. In wounds of the neck, for example, a patient would hardly be comfortable or safe with acupressure needles sticking, like so many arrows, in his flesh. It would not be easy to secure the subclavian artery with such a contrivance. Hemorrhage of the ophthalmic artery, deep in the orbit of the eye, could not be safely controlled by acupressure.

Professor Simpson has evidently, we think, overrated the injurious effects of the ligature. He asserts that every thread, however delicate, thrown round an artery, acts as a seton, provoking irritation and discharge. To some extent this is unquestionably true. That portion of the artery included by the ligature always perishes, and must therefore be thrown off as a slough. In general, however, the irritation thus induced is comparatively slight, and hardly, if at all, interferes with the reparative process. It is only, or chiefly, when the parts have been seriously bruised, concussed, or otherwise injured, that the ligature is likely to cause serious mischief, and then even an acupressure-needle would hardly fail also to act as a seton. Severe shock and loss of blood always powerfully predispose to the production of pyæmia, an occurrence for which, in the opinion of our author, the ligature is often more to be blamed than anything else. The needle used in effecting apposition in hare-lip not unfrequently excites free ulceration, even when there is comparatively little tension, clearly showing that a metallic substance is by no means as innocuous as some of its advocates would lead us to infer.

When numerous ligatures are used, it is easy to perceive that they must more or less seriously interfere with the adhesive process; and, in such an event, there must also, of necessity, be much greater risk of erysipelas and pyæmia. It is not often, however, that this is required; in general, a few ligatures only are needed in any wound, however extensive. We may remark, in passing, that there is still too much disposition on the part of operators, even of the greatest intelligence and respectability, to employ unduly large ligatures, apparently unaware of the mischief which such a practice is almost always sure to produce.

The horrors of the ligature are thus depicted by our author:—

“Nothing,” says he, “in the whole round of professional practices and customs, seems to me to be a more curious anomaly and paradox than to watch surgeons sew up with the greatest artistic exactitude and nicety the lips of an amputation or other wound with metallic sutures, while they have waywardly and designedly left, buried in the interior of the wound, a series of silken ligatures, each of which will inevitably produce ulceration and sloughing at the ligatured points. The finished wound is apparently all tidiness and neatness without; but within there are minute strangulated sloughy portions of festering tissue, the sphacelation of which must inevitably be attended by ulceration and suppuration. It is like enforcing cleanliness, as it were, and the best hygienic measures outside a house, whilst within doors there are retained and locked up filth and decomposition, and explosive elements of destruction and disease. It is, in short, the old story of the ‘whited sepulchre,’ ‘beautiful outwardly,’ but within ‘full of uncleanness.’”

The advantages of acupressure over the ligature are thus summed up: 1. It requires no isolation of the artery. 2. It causes no direct mechanical injury, contusion or laceration of the two internal tunics; nor any strangulation, ulceration or mortification of the external one. 3. It does not lead to suppuration in the wound. 4. The needles used in it do not imbibe any animal fluids. 5. It excites inflammation only up to the stage of adhesion. 6. It generally occludes both artery and vein; is removable within a few hours, or, at most, a few days, at the will of the operator; requires only one person to perform it; and is seldom followed by secondary hemorrhage. 7. It places the wound locally in far healthier hygienic conditions. 8. It is much less likely to occasion erysipelas and pyæmia. 9. It makes complete primary union more frequent, and healing quicker.

We omit the consideration of a number of highly interesting topics discussed in these pages. The reader will find in them a more full and accurate account of metallic ligatures, sutures, and kindred appliances than in any other work extant. Nothing seems to have escaped the eye of the learned author.

We rise from the perusal of the treatise before us with increased respect and admiration for Professor Simpson. Whatever may be the ultimate fate of acupressure, whether it shall be universally adopted by the profession as a substitute for the ligature, or whether it be partially or completely rejected as a useless innovation, it is impossible to award too much praise to a man who has been at such pains to place the subject in so clear and tangible a light before the public. We hope that he may be spared to witness surgery, as a practical science, honourably advanced by his own labours; for, to borrow his own language, its march must ever be forwards; it can acknowledge no boundaries to its development, and knows of no finality. The work is beautifully printed, and the illustrations, forty-two in number, are, in general, well executed.

S. D. G.

ART. XX.—*Osmosis: the Forces by which it is accomplished, and its Agency in various Physiological and Pathological Processes, and in the Action of Medicines and Poisons.*

1. *De l'Endosmose des Acides.* Par M. DUTROCHET, Membre d'Académie des Sciences. Mémoire lu à l'Académie des Sciences le 19 Octobre, 1835.
2. *Endosmosis.* By H. DUTROCHET, M. D. In *Encyclopædia of Anatomy and Physiology*, by R. B. TODD, M. D. London, 1837.
3. *Lectures on the Physical Phenomena of Living Beings.* By CARLO MATTEUCCI, Professor of the University of Pisa. Translated under the Superintendence of Jonathan Pereira, M. D., Vice-President of the Royal Medical and Chirurgical Society. Philadelphia, 1848. Reprint.
4. *Researches on the Chemistry of Food, and the Motion of the Juices in the Animal Body.* By JUSTUS LIEBIG, M. D., Professor of Chemistry in the University of Giessen. Edited by Wm. Gregory, M. D., Professor of Chemistry in the University of Edinburgh, and Eben N. Horsford, A. M., Rumford Professor in the University of Cambridge. Lowell, 1848.
5. *Report on the Laws according to which the Mixing of Fluids and their Penetration into Permeable Substances occur, with special reference to the Processes in the Human and Animal Organism.* By JULIUS VOGEL. Chemical Reports and Memoirs of the Cavendish Society. London, 1848.
6. *On Phial Diffusion.* By Prof. GRAHAM. *Philosophical Transactions.* London, 1850.
7. *Liquid Diffusion applied to Analysis.* By THOMAS GRAHAM, F.R.S., Master of the Mint. *Philosophical Transactions*, Vol. 151, for 1861.
8. *Elements of Inorganic Chemistry.* By THOMAS GRAHAM, F.R.S. L. and E. Edited by Henry Watts, B.A., F.C.S., and Robert Bridges, M.D. Second American edition. 1858. Chapter "Osmose."

SINCE the experiments of Dutrochet on the subject, Osmosis has attracted much attention on the part not only of physicists, as a portion of natural science, but of physiologists, pathologists, and practitioners, who have sought aid from it in accounting for the molecular movements of the body, and in explaining the *modus operandi* of medicines. Although Dutrochet, of late years, has the merit of placing the two phases of osmosis, under the names of endosmosis and exosmosis, prominently before the scientific public, he cannot be considered as having been the first experimenter with regard to it. In the *Histoire de l'Académie des Sciences*, 1748, the Abbé Nollet directed attention to the passage of liquids of different composition through the membrane which separated them. The subject at this time occupies a more important position than formerly, because it is now known that a greater number of forces enter into the operation than was originally supposed. In treating of this subject at present, it is with the intention of bringing to bear upon medicine the assistance that has been furnished by the eminent investigators whose results have so largely contributed to our

knowledge, and of presenting as clearly as possible the *rationale* of the process of absorption in the living body.

It is stated by Matteucci that "there is no fact which demonstrates the existence of free extremities in the ramifications of bloodvessels, which everywhere present a very close and continuous reticulated structure. The arterial network is uninterruptedly continuous with the venous network, which in general preponderates over the former. The lymphatic system, likewise, never terminates by independent extremities, but everywhere presents the aspect of a very fine and close trellis-work. Anatomy, which agrees with physiology, leads us to the conclusion that the first part of absorption can be effected only by the aid of the porosities proper to the structure of organized bodies. In this way the absorbed matters arrive at and are mixed with the blood, the chyle, and the lymph, and are carried away by these liquids, and distributed over the body." The above quotation is the embodiment of the doctrine now entertained by physiologists, and as there are no defined perforations or mouths to the vessels admitted by them to exist, it is necessary to have recourse, for the purpose of explanation, to the property found in connection with all porous substances, viz., that of physical imbibition, which has been termed, when presented in organic tissues, by Dutrochet, *endosmosis* or *endosmotic* action. The reverse of this, or exudation, has been called *exosmosis*. As the phenomena of both of them are dependent on the same forces, as will be shown hereafter, it has been proposed by Prof. Graham to adopt the term *osmosis*, which is from the Greek word *οσμος*, impulsion, and which includes both series of phenomena.

It may be remarked that Magendie and Foderé rejected the idea of absorption by any other mode than by imbibition. The latter, in his researches upon exhalation and absorption, calls the first transudation, and the latter imbibition, which his experiments prove.¹ The idea of exhalant vessels in connection with that of open absorbent vessels has been abandoned. Porosity is a characteristic of living as well as of inanimate matter, and, as remarked by Matteucci, it will be readily admitted that capillary actions must exercise a great influence over the functions of the tissues of animals and vegetables, when we reflect that the interstices and the capillary tubes of the tissues have a diameter of from $\frac{1}{100}$ to $\frac{2}{100}$ of a millimetre (from $\frac{1}{1540}$ to $\frac{1}{5080}$ of an inch).²

It must be understood that capillary action is not the sole cause of absorption in living tissues, but that it conduces to it by affording the means by which fluids can enter through the interstices of the tissues. The animal membranes must be sufficiently porous to be moistened, or suck into their interstices by capillary attraction the fluid presented. But capillary attraction cannot produce motion beyond the limits of the solid body with which it is connected, and there are other forces operative, which must be taken into the calculation in the endeavour to explain the process.

OSMOSIS.—The simplest definition that has been given of the phenomena connected with this operation is the one by Matteucci of endosmosis, that "it is the mutual action of two liquids on each other when separated by membrane."³ When osmosis takes place in the living body, the animal tissues are penetrated by fluids (either simple or charged with soluble matters) which are brought into contact with them, and all animal membranes

¹ Recherches Experimentales sur l'Exhalation et l'Absorption. Read before the Institute, and published. Paris, 1824.

² Lectures, p. 31.

³ Lectures, p. 45.

are more or less pervious, so as to permit the transmission of fluid or aid in its accomplishment. This, however, takes place in accordance with laws which are determined by the character of the fluids and the structure of the tissue. The phenomena of osmosis are arranged into two series, manifested by a stronger and weaker current. The first of these correspond with *endosmosis*, and the second with *exosmosis*.

When the subject first attracted the attention of physicists, several hypotheses were given to account for the process. The fact most conspicuous was that when two fluids of different specific gravities were separated by membrane, there existed a tendency on the part of the lighter one to pass to the denser, and this naturally suggested the idea that the latter exerted an attractive influence. Indeed, the direction towards denser fluids of lighter ones renders the porosity of animal membranes most conspicuous. Thus, if a section of fresh chicken's intestine be tied at one end, then half or three-quarters filled with a solution of sugar, and, after being tied at the other end, thrown into a vessel of clear water, in a little time it will become distended, the water passing into the intestine so as to augment the sugary solution.

It was suggested that viscosity is the cause of the attraction, but this conjecture has been proved to be erroneous by an experiment of Dutrochet with a solution of sugar and one of gum-Arabic. If corresponding weights of sugar and of gum be dissolved in the same weight of water, the viscosity will not be uniform; that of the gum solution will be greatest. Now, if these be separated by membrane, the direction of the current will be in excess from the gum solution to that of the sugar; and this will be the case if the strength of the former be doubled, the specific gravities then being as 1.023 to 1.014.

Another violation of the rule that specifically lighter fluids pass to the denser is exhibited by alcohol and ether, which are of less specific gravity than water, and yet the latter passes the membrane to them. In the instance of vegetable acids we have a remarkable illustration of the same fact. Thus, a saturated solution of oxalic acid, sp. gr. 1.045, at 77° F., when placed in contact with water separated by membrane, passes to the latter, with augmentation of its bulk and a diminution of its own specific gravity. This experiment was constant in its results, and it appeared that the denser the solution the stronger was the current. Citric and tartaric acids are more soluble than oxalic, and a denser solution can be made of them. When solutions were made of sp. gr. 1.05, it did not appear that an attraction for water existed so as to lead to augmentation in the bulk of the solutions, but there was a reciprocal penetration of the water and the acid through the membrane. At a sp. gr. above 1.05, the water passed to the acid solution, and below this density, as in the case of oxalic acid, the acid solution passed to the water.¹ It is evident from these results that density *per se* is not a cause of the increase of bulk in connection with endosmotic movement.

The question which presented itself to Dutrochet was, whether the power of ascension in capillary tubes is in any way a measure of endosmotic force, and whether it coincided with the facility of penetration. It has been stated that water passes to alcohol and ether, and both of them have less ascending power than water; while solutions of the acids mentioned, having less ascending power than water, when below the sp. gr. of 1.05, pass to the water. This, then, does not throw light upon the subject any more than

¹ Dutrochet. Mémoire.

does the rapidity of penetration through capillary tubes or membrane, for it was found by Liebig that a solution of gum was less readily filtered through a capillary tube than one of sugar; and yet, when even of double the strength, the former augments the latter through membrane. The solution of oxalic acid was found to filter through membrane less rapidly than water.¹

The cause of osmosis to be first examined is that connected with *imbibition* by animal membranes, or the capillary absorbing power with respect to fluids, and this has been found to vary with different liquids. It may be characterized as an *affinity* of membranes for fluids, which is diverse. Pure water is readily imbibed by membrane, while the absorbing power for solution of salt diminishes in the ratio of saturation of the solution. A mixture of water and alcohol is taken up also in proportion to the dilution. Liebig found that 100 parts of ox-bladder take up in 24 hours—

Of pure water	. . . . .	268 vols.
" saturated solution of sea salt (brine)	. . . . .	133 "
" alcohol of 84 per cent.	. . . . .	38 "
" oil of marrow	. . . . .	17 "

And 100 parts by weight of ox-bladder take up in 48 hours—

Of pure water	. . . . .	310 parts by weight.
" mixture, $\frac{1}{3}$ water, $\frac{2}{3}$ brine	. . . . .	219 " "
" " $\frac{1}{2}$ " $\frac{1}{2}$ "	. . . . .	235 " "
" " $\frac{2}{3}$ " $\frac{1}{3}$ "	. . . . .	288 " "
" " $\frac{1}{2}$ alcohol, $\frac{1}{2}$ water	. . . . .	60 " "
" " $\frac{1}{3}$ " $\frac{2}{3}$ "	. . . . .	181 " "
" " $\frac{1}{4}$ " $\frac{3}{4}$ "	. . . . .	290 " "

When *Endosmosis* takes place, there must be a superior affinity between the interposed membrane and one of the fluids, or, in other words, for one of them the membrane must possess a greater imbibing tendency. If alcohol be confined in a bladder, and exposed to the atmosphere, the water passes through the bladder and evaporates, thus concentrating the alcohol; but when a membrane of India-rubber is used to separate water and alcohol, the alcohol penetrates the septum, and passes to the water. In these examples we have illustration of an elective affinity on the part of membranes.

Imbibition through membranes varies in accordance with the surface which is exposed to the entering liquid. If the most porous surface be placed in contact with it, the entrance of the fluid will be promoted. If the reverse be presented, the introduction of the fluid will not be so active; and should the most porous surface be brought in contact with alcohol or

¹ Difference in passing through a capillary tube:—

Equal quantity of water	. . . . .	time required, 157 seconds.
" " " Sol. of sugar, sp. gr. 1.014,	" " " "	159 "
" " " " gum, " " "	" " " "	262 "
" " " " " " 1.023,	" " " "	362 "

In filtering by gravity, at 69° F., the time being the same:—

Water passes to the extent of	24 parts.
Solution of oxalic acid, sp. gr. 1.005	12 "
" " " " 1.01	9 "

This was the result when each fluid was placed above the same fluid, but separated by membrane.

² The same facts were presented when experimenting with pig's bladder. Researches on the Motion of the Juices of the Animal Body, by Justus Liebig, p. 135. (*Op. cit.*)

coagulating solutions, the probability is that a restraining influence will be exerted from a change in the surface by the action of such fluids.

Pressure exercises an influence upon the passage of fluids through membranes, and the degree of it required for different fluids has been found to be varied.

In experiments upon the force required to produce the passage through membranes when simply moistened by the fluid, it was found by Liebig that this depends upon the thickness of the membrane, and that through ox-bladder $\frac{1}{10}$ of a line in thickness—

Water requires a pressure of	.	.	.	12 in. of mercury.
Saturated solution of salt	.	.	.	18 “ “
Marrow oil	.	.	.	34 “ “

When the membrane used was the peritoneum of the calf, $\frac{1}{20}$ of a line thick—

Water required a pressure of	.	.	.	8.10 in. of mercury.
Solution of salt	.	.	.	12.16 “ “
Marrow oil	.	.	.	22.24 “ “
Alcohol	.	.	.	36.40 “ “

Alcohol, then, the most limpid fluid, and having the least specific gravity, requires the most pressure.

From the above experiments it appears that the amount of pressure required is inversely as the force of capillary attraction; that is, where the greatest capillary attraction exists, there less pressure is required.

The force of capillary attraction is in many cases so great as to be capable of equipoising a considerably opposing force. If, for instance, a glass tube be so tightly closed by bladder that no fluid can penetrate between the glass and the animal membrane, and if it then be filled with water, the capillary attraction of the bladder will retain the water with so much tenacity that the pressure of a column of water several feet high will not be able before a period of several hours to force any appreciable quantity of water through the bladder, and many days, or even weeks, will intervene before a column of water several inches in height, and whose base covers the surface of the bladder, will be able to penetrate through the membrane. The resistance of capillary attraction is not, however, absolute, as the pores may be unequal. The simplest exhibition of capillary force is in the case of water rising in blotting-paper in opposition to gravity,¹ and it is apparent from experiments that the mechanical influence exercised by a permeable substance upon the fluid penetrating into it consists in the fluid being attracted by the substance with a force that opposes a certain resistance to other mechanical forces acting on the fluid, as gravity, hydrostatic pressure, &c.²

When fluids of similar properties are separated by membrane which is permeable, if the hydrostatic pressure be equal on both sides, no change will occur. If, however, the pressure be stronger on one side than the other, a certain quantity of the fluid under pressure will pass to the other.

¹ Vogel, Chemical Reports and Memoirs, Cavendish Society, pp. 93, 94.

² This force has been recognized and applied to the purposes of lifting weights and splitting rocks.

Different kinds of filters furnish examples of the varied manner in which mechanical capillary force acts in individual cases. If a fluid be poured into a funnel, it will run through more rapidly than when it has first to pass through a filter. In the latter case the impediment is afforded not only by the opposing solid body, but by the resistance of the capillary attraction in the interstices or pores. In many filters this is considerable. (Vogel, *op. cit.*, pp. 93, 94.)

This quantity will correspond to the excess of pressure on the one side, allowing for the resistance opposed to the pressure by the mechanical capillary force.¹

Mucous membrane readily permits the passage of liquids. That of the stomach of the dog, the cat, and the lamb, and of the bladder of the ox were employed by Matteucci and Cimma in their experiments. With the different solutions used, the position favourable to endosmotic action was from the interior to the exterior surface, and between the two there was greater variety than with the skin of the eel, the frog, or torpedo.²

The following conclusions were arrived at from the experiments of the above named experimenters :—

“1st. The membrane interposed between the two liquids is very actively concerned, according to its nature, in the intensity and direction of the endosmotic current.

“2d. There is, in general, for each membrane a certain position in which endosmosis is most intense, and the cases are very rare in which with fresh membrane endosmosis takes place equally, whatever be the relative position of the membrane to the two liquids.

“3d. The direction which is most favourable to endosmosis through skins is usually from the internal to the external surface, with the exception of the skin of the frog, in which endosmosis, in the single case of water and alcohol, is promoted from the external to the internal surface.

“4th. The direction favourable to endosmosis through stomachs and urinary bladder, varies with different liquids much more than through skins.

“5th. The phenomenon of endosmosis is intimately connected with the physiological condition of the membranes.

“6th. With membranes dried, or altered by putrefaction, either we do not observe the usual difference ensuing from the position of their surfaces or endosmosis no longer takes place.”

Another phase of osmotic action is that which has been referred to as *Exosmosis*. While there is a tendency on the part of a lighter fluid to pass to a denser one through membrane, the denser may pass to the lighter and alter its specific gravity. Thus, while water passes through the parietes of a fowl's intestine to augment the sugary liquid solution contained in it, the sugary fluid itself will pass outwards to mingle with the water, and this to the greater extent as the intestine becomes distended.

An experiment, the reverse of that detailed in illustrating endosmosis, may be performed with the intestine of the fowl. If a section be completely filled with water, and thrown into a solution of sugar, the intestine will be partly emptied by the abstraction of the water, while the remaining water contained in it will assume the taste of sugar and greater specific gravity. If a portion of the intestine of a fowl be filled with a watery solution of gum Arabic and rhabarbarin, and when tied close, laid in a vessel of water, the intestine becomes tensely distended, and the rhabarbarin exudes from it. Similar experiments may be performed with albumen or saline substances.

Prof. Jolly, of Heidelberg, exhibited the same exosmotic phenomenon by the following experiment : A saline solution, containing a known quantity of salt, was placed in a glass tube, closed at the bottom with bladder ; this was placed in water, frequently changing it to keep it pure. The tube and its contents were taken out from time to time, and weighed. This was repeated until the weight was constant. The absence of the salt was thus

¹ Vogel, op. cit., p. 93.

² Matteucci, Lectures.

demonstrated, and nothing but water remained.¹ Exosmosis and endosmosis, as will be exhibited hereafter, are both dependent upon the same principles; and we may regard exosmosis as it has been represented above, as analogous to the operation which has been termed dialysis by Prof. Graham.² But, while it is admitted that membranes have the power of imbibing fluids by capillary attraction with a force which differs for the several liquids, there exists a displacing power exerted by one fluid upon another, which frequently is at variance with and in direct opposition to the force with which a fluid is attracted by membrane, and it appears that those which even have less facility of being imbibed may displace others for which the affinity on the part of membranes is stronger. This is illustrated by the experiments of Liebig.

He found that 100 parts of animal membrane (dry ox-bladder) absorb in 48 hours 310 parts of water and only 133 of saturated solution of salt. If when saturated with water it be strewed with salt, a saturated solution of salt is formed which replaces the water. It follows therefore that as membrane has a capacity for 310 parts of water and for only 133 parts of the saline solution, there is a diminution of the absorbent power of the bladder to the extent of 177 parts, which are expelled, and run off in drops. A similar effect of reduction of fluid will take place if the membrane holding water be brought in contact with a solution of salt. "Membranes, fibrin, or a mass of flesh behave exactly in the same manner when in contact with alcohol. If placed in alcohol in the fresh state, that is, when they are thoroughly charged with water, there are formed at all points where water and alcohol meet, mixtures of the two; and as the animal texture absorbs much less of the alcoholic mixture than pure water, more water is expelled than of alcohol taken up."³

In connection with such displacement as is here exhibited there must be and actually is shrinking of texture. If the results presented in these examples depended solely upon capillary attraction, the anomaly would be presented of a weaker force overcoming a greater, inasmuch as the imbibing power is superior on the part of membrane for water to that for brine or alcohol.

The very opposite to the facts which have been stated is also found to occur. Thus if we tie over one end of a cylindrical tube a membrane (bladder) saturated with concentrated brine, by steeping for twenty-four hours, and if we dry the outer surface of the membrane carefully with bibulous paper, and now pour a few drops of pure water into the tube, so as just to cover the inner surface of the membrane; the outer surface is seen in a few moments to be covered with minute drops of brine; that is, brine flows out of the pores of the bladder. Mr. Whitelaw has detailed some experi-

¹ Elements of Chemistry. By Prof. Graham.

² In the case of exudation, pressure is an important element of power; under its influence in the vessels there must ensue the loss of fluid, as is illustrated in diarrhoeas, dropsies, &c.

³ 9.17 grammes of fresh bladder contain 6.97 grammes of water, 2.22 of dry ox-bladder; when placed for 24 hours in 40 c.c. of alcohol, the weight is 4.73 grammes, there has consequently been a loss of 4.44 grammes. In the 4.73 grammes which remain there is the 2.22 of dry bladder, and only 2.51 of liquid. If we assume that this liquid has the same composition as the surrounding mixture 84 per cent. of alcohol to 16 of water, it will consist of 2.11 grammes of alcohol and 0.40 of water, and therefore of the 6.97 grammes of water originally present, 6.45 have been expelled and replaced by 2.11 alcohol. For one volume of alcohol retained more than three of water have been expelled. (Liebig, *op. cit.*, 137.)

ments on the removal of the salt in brine contained in salted beef, by soaking in sea-water until the beef becomes comparatively fresh and expands like a sponge, resuming a part of the natural juices from the brine.¹ In these cases is exhibited the preponderating force of attraction for the fluid (pure water or a weaker solution of salt) for which there is the greatest affinity on the part of the membrane.

There can be no doubt, from the foregoing statements, that an important element in the displacement that occurs when brine or alcohol are brought into contact with water contained in membrane, so that the membrane retains a less amount of the mixture than of the water is the diminished absorbing capacity of the membrane, or less affinity for the mixture. The displacement, in the interstices of the membrane, of a fluid for which the membrane has greater affinity, by one for which it has less, cannot depend upon a cause residing in the membrane itself, other than the diminution of capillary attraction or power of imbibition.

It is evident that membrane has an attraction for fluids, or an affinity for them which varies for each, yet in the case of each is definite. If the membrane, therefore, has imbibed a fluid, and another is brought in contact with it so as to form a compound of the two for which the membrane has greater attraction, this will take possession of the membrane to the exclusion of the first contained in it. Thus, if the membrane contain a saline solution or alcohol and be brought into contact with water, and there be dilution of either fluid, the greater amount taken up of the diluted fluid would appear to depend upon the superior capillary attraction for that fluid which thus becomes the displacing fluid. Where contraction has taken place under the entrance of the first fluid, expansion will be brought about by the introduction of the second. But the reverse of this is also the case. If the membrane has imbibed a fluid and another is brought into contact with it, so as to form a compound fluid for which the membrane has *less attraction*, the fluid for which there is the *greatest affinity* is displaced, and the new one takes its place. A solution of salt will displace pure water, as has been seen, and the same is the case with alcohol. By sprinkling salt on moistened bladder the solution of salt formed will enter the intestines of the bladder to the exclusion of the water, which will appear in drops on the surface.² Meat is salted by sprinkling the salt upon the surface, and this operation is attended with contraction of fibre and loss of juices. It may be assumed, therefore, that as the displacement overcomes and is in opposition to superior capillary attraction, there is a *new force* brought into operation, and this is the *affinity* between the *two liquids* or of the liquid for the substance (salt for example) placed in contact with the membrane, which affinity is greater than that of the membrane for the fluid which it most easily imbibes. *If there be no affinity between fluids, the one for which the membrane has the least attraction will not take the place of the other, will not displace it.*

It is assumed by Liebig that the "relation of bladder, fibrin, and other animal substances, when saturated with water, to alcohol and brine, proves that the shrinking of these tissues does not depend upon the abstraction of water in consequence of the affinity of alcohol or salt for that liquid, as it is certain that the attraction of alcohol for water or water for alcohol are respectively equal. The attraction of water within the tissue for alcohol

¹ Dublin Medical Press, June 22, 1864. Med. News, Phila., Aug. 1864.

² Liebig, op. cit.

without, is just as strong as the power of the alcohol without to combine with the water within. Less alcohol is taken up and more water given out because the animal tissue has less attraction for the mixture of alcohol and water than for pure water alone."¹ So far as it goes, this statement is correct, but does not meet the difficulty of explaining why a less affinity on the part of membranes supplants a greater. It must be that the attraction of water for alcohol or of alcohol for water is superior to the attraction of the membrane for water, and hence it parts with it, and the alcohol without becomes diluted, while the water within becomes mixed with a certain proportion of alcohol. Hence it is that "this exchange is only arrested when the attraction of water for the animal tissue and its attraction for alcohol counterpoise each other."

In the case of fibrin or membranes containing alcohol or salines when brought into contact with water, the capillary attraction for the water being greater than for the alcohol or the salines, they can be displaced by it, yet the process is greatly facilitated by the power possessed by them of combination with water.

In all the cases that have been given, there is a power of combining between water and other liquids, a capacity of union between them which plays an important part in the phenomena of imbibition. But there are other instances in which the property of combination does not exist; thus Chevreul determined that when tendons and ligaments saturated in oil were placed in water, the oil is completely expelled, and they take up as much water as if they had not previously been in contact with the oil. Now as there is but the feeblest affinity between the oil and the water the introduction of the latter must depend upon the greater affinity of the membrane for it.

A dried bladder continues hard and brittle in alcohol and oil, its flexibility is in no degree increased by absorbing them. Although these fluids can be displaced from membrane by water, they can be assisted in their own introduction by it. In the case of oil, water may act by expanding the capillary pores, thus facilitating the entrance along with it. The fact is well known and acted upon by carriers, that by working and pressure moist leather can be made to take up more oil than dry. Again, leather that has been exposed to moisture becomes hard and dry by the expulsion of the oil, and before re-oiling it the surface should be sponged or moistened with water. In the filtration of oily matters it is best to moisten the filter so that the oil shall not clog the pores of the material used. In this way the oil can better pass through the pores which are moistened by the water, adhesion to them being prevented. Oil is introduced into the lacteals in the form of emulsion or of a saponaceous compound, by which the same influence is most effective.

The attempt has been made to show that where there is a faculty of combining between water and other fluids in consequence of mutual attraction between them, the mere power of imbibition on the part of membrane is not of primary consequence, it has a secondary office, for did displacement rest upon this power it would be perfect, and no salines or alcohol be left in the interstices of the membrane; whereas the displacement is limited by the dilution of the saline or the alcohol, and the membrane holds in its interstices a weaker solution, the amount retained being governed by the dilution. In other terms the force of combination

¹ Liebig, *op. cit.*, p. 138.

between the saline or alcoholic solution regulates the nature and degree of the imbibition. It is not the mere attraction of the membrane for water which deprives it of salines, but the diluting effect of the water on the salines, and this latter depends upon the *force of chemical affinity between them*.

The power of imbibition, which has been considered, depending upon capillary attraction, accounts for the introduction of fluid into the interstices of membrane, but not for absorption into the vessels so as to form a part of the fluid material of the circulation, for, as remarked by Liebig, "liquids flow out of capillary tubes which are filled by them, *only when some other force or cause acts*, because capillary attraction cannot produce motion beyond the limits of the solid body which determines the capillary action. We are, therefore, under the necessity of seeking for an additional force which will explain the fact of a current from without setting into the circulation. This force resides in the power of *diffusion*.

The tendency of substances to extend themselves through fluids or of fluids to diffuse themselves through each other is the foundation of *solution*, and the force which operates under such circumstances is that of attraction. The solubility of substances depends upon this attraction on the part of molecules of solid soluble matter and the molecules of the liquid in which they can dissolve, and when in solution such substances can be further diffused so as to form a more dilute solution. In proportion to the strength and energy of the attraction is diffusive mobility exhibited by different substances, and, as remarked by Graham, appears to be as "wide as the scale of vapour tensions."¹ Diffusive attraction producing solution may take place in any degree below the point of saturation, where the force of attraction has its limit. "In a mixture of alcohol and water or of brine and water there is in every part the same proportion of particles of alcohol and water and of salt and water." The attraction which exists has been placed by Liebig under the denomination of chemical affinity, although it is not attended with alteration in the character of the molecules that are interested.²

In the case of solution there may be manifested an elective affinity, depending on the greater facility of solution possessed by one substance over another. The most soluble substances are dissolved with the greatest velocity. Thus, hydrate of potassa may be said to possess double the velocity of diffusion through water of sulphate of potassa, and, again, double the velocity of sugar, alcohol, and sulphate of magnesia (Graham). If oil and salt are combined and water added, the larger proportion of the salt will be given up to the water in consequence of elective affinity. Liebig has given some pertinent illustrations of the same fact. If a solution of sulphate of potassa be formed and liquor potassæ be added, the sulphate will be separated, obeying the natural attraction of its particles and crystallizing, in consequence of the superior affinity of the potassa for water. Alcohol will separate a number of salines from water. When hydroferrocyanic acid is liberated from ferrocyanide of potassium in solution by diluted muriatic acid, it is held dissolved by the water, but if the vapour of ether be passed through the solution the whole of the acid is set free in the form of white or bluish-white crystalline scales, so as to become a semi-solid mass.

¹ Liquid Diffusion, Graham, p. 185, Philos. Trans.

² Recherches, &c., op. cit., p. 150.

The same view of solution that has been presented is taken by Vogel, who states "if two fluids whose constituents chemically attract each other come in contact, they will combine and form one mixed fluid, homogeneous in its nature, of which each smallest particle will exhibit a like property. If, for instance, we mix a fluid consisting of twenty parts of salt and eighty parts of water with one hundred parts of water, a solution will be formed, the smallest distinguishable particle of which will contain nine parts of water to every part of salt." If we suppose the two commixing fluids be separated masses, then the constituent particles of each will attract those of the other, and conversely. This species of attraction is stronger than that existing between the constituents of each body among themselves. Thus, atoms will pass from *a* to *b*, and again from *b* to *a*, until both fluid masses have become chemically equal; that is, have assumed a like composition. If a lump of sugar or alum be placed in water, the particles will tend to separate and diffuse themselves, the attraction of the water for the sugar or alum, and of the sugar or alum for the water overcoming the attraction between the particles of either.

This attraction may take place laterally, and as the particles of the substance must thus pass through all the particles of the solvent until the last are reached, by transmission, as it were, from one to another, a longer time is required. The same also happens where solution goes on upwards. A downward solution is aided by gravity, as where sugar is suspended in water. If the body be heavy which is to become commingled with a fluid and has to ascend, or the material be light and floats on the solvent, a greater time must be consumed for the diffusion to be effected. For instance, a solution or a lump of salt at the bottom of a column of water will be longer in reaching the surface of the water, while alcohol, on a similar column of water, will also be longer in diffusing itself, both being in opposition to gravity. Motion, whether from heat or a mechanical cause, promotes attraction by the more rapid diffusion of molecules or the production of currents.

The degree and the velocity of diffusion possessed by different substances have been investigated by Prof. Graham, by whom most interesting results have been obtained. He has divided substances which are soluble into two kinds, *crystalloids* and *colloids*, the latter so called from their behaviour like glue in the presence of water. The results observed were in opposition to gravity, which method presents the strongest test of attracting force. To this method Prof. Graham has given the appellation of "jar diffusion;" it is practised in the following manner: A saline or other solution is placed at the bottom of a jar, and then water placed above the stratum. After a certain time the amount of the saline, which has raised itself upwards, may be determined in the various strata of water. In this way the relative attraction or solution of different soluble substances may be determined. For the sake of illustration, the following table is presented, the experiments having been conducted with two crystalloids, *salt* and *sugar*, and two colloids, *gum* and *tannin*:—

Experiments showing the diffusion of 10 per cent. solutions through pure water, after 14 days, at 50° Fahr.

						Salt.	Sugar.	Gum.	Tannin.
Stratum	1	.	.	.	.	.104	.005	.003	.003
"	2	.	.	.	.	.129	.008	.003	.003
"	3	.	.	.	.	.162	.012	.003	.004
"	4	.	.	.	.	.198	.016	.004	.003
"	5	.	.	.	.	.267	.030	.003	.005
"	6	.	.	.	.	.340	.059	.004	.007
"	7	.	.	.	.	.429	.102	.006	.017
"	8	.	.	.	.	.535	.180	.031	.031
"	9	.	.	.	.	.654	.305	.097	.069
"	10	.	.	.	.	.766	.495	.215	.145
"	11	.	.	.	.	.881	.740	.407	.288
"	12	.	.	.	.	.991	1.075	.734	.556
"	13	.	.	.	.	1.090	1.435	1.157	1.050
"	14	.	.	.	.	1.187	1.758	1.731	1.719
"	15	.	.	.	.	2.266	3.783	5.601	6.097
						9.999	10.003	9.999	9.997

The superimposed column was 4.38 inches in height, 111 millimetres in all. The first stratum of chloride of sodium contained 1 per cent., and the first stratum of sugar contained .005, which shows that the sugar had just reached the top. In the case of the gum and tannin, the seventh stratum presented decided evidences at the height of 2.2 inches. What is above that the experimenter attributes to accidental dispersion.

Experiments with sulphate of magnesia, and albumen and caromel, both colloid substances. Diffusion of 10 per cent. solutions for 14 days.

					Sulph. magnes. at 10° R.	Albumen at 13°-13.5 R.	Caromel at 10°-11° R.
Stratum	1	.	.	.	.007	.000	.000
"	2	.	.	.	.011	.000	.000
"	3	.	.	.	.018	.000	.000
"	4	.	.	.	.027	.000	.000
"	5	.	.	.	.049	.000	.000
"	6	.	.	.	.085	.000	.003
"	7	.	.	.	.133	.000	.005
"	8	.	.	.	.218	.010	.010
"	9	.	.	.	.331	.015	.023
"	10	.	.	.	.499	.047	.033
"	11	.	.	.	.730	.113	.075
"	12	.	.	.	1.022	.343	.215
"	13	.	.	.	1.383	.855	.705
"	14	.	.	.	1.803	1.892	1.725
"	15	.	.	.	3.684	6.725	7.206
					10.000	10.000	10.000

This table shows the *attraction of solution* which lifts the heavy particles from the bottom, and it likewise exhibits the difference between the solubility of crystalline and colloid bodies. The albumen did not in fourteen days advance to the seventh stratum, while the caromel only reached the sixth stratum.

By the further tabulated experiments of Graham it will be found that diffusion, in relation to time, is progressive, but not entirely uniform. The longer the time, the more complete the diffusion from persistence of the attracting force; thus, with chloride of sodium, in four days the upper stra-

tum contained .004, while, as has been shown by the above table, in fourteen days it reached .104. The disparity of diffusion between crystalloids and colloids is shown in relation to time; thus, sugar advances in two days nearly as much as albumen in fourteen days. There is some disparity in point of time, when substances are compared with each other, as it appears that a fourteen days' diffusion of sugar is greater in amount than a four days' diffusion of chloride of sodium, but less than a five days' diffusion of that substance. The diffusion of chloride of sodium appears to be pretty nearly three times greater or more rapid than that of sugar. Experiments made with hydrochloric acid and chloride of sodium show that the diffusion of the first in three days closely corresponds to that of the second in seven days.¹ The rapidity of mixture or solution depends on the *degree* of chemical affinity between fluids or substances and their solvent, the mobility of the particles of one or the other having a favourable or unfavourable influence on the result; fluids or substances of tough, viscid consistence have feebler affinity, their own cohesion being with greater difficulty overcome. There is another element in calculating the rapidity of diffusion which must be taken into consideration; it is the lessened attraction as fluids imbibe the diffusing matter. According to Prof. Graham, the general law which regulates such movements with reference to salt appears to be this: "The velocity with which a soluble salt diffuses from a stronger to a weaker solution is proportional to the difference of concentration between two contiguous strata."

Substances when in solution together, so as to form a compound solution, obey the force of diffusive attraction as when they are separate, and in this case the inequality of diffusion becomes apparent if there exist a difference in the solubility. Sugar and gum, when united in solution, will diffuse themselves as shown by the table. A mixture of two salts being placed at the bottom of a jar, it may be expected that the salts will diffuse pretty much as they do when they are diffused separately, the more diffusive salt travelling most rapidly, and showing itself first and always most largely in the upper strata. The early experiments of Prof. Graham on diffusion from phials had shown indeed that inequality of diffusion is increased by mixture, and the actual separation is consequently greater than that calculated from the relative diffusibilities of the mixed substances. According to these experiments, chlorides of potassium and sodium diffuse nearly in the proportion of 1 to .841.

¹ The general results of several series of experiments may be expressed approximately thus, with respect to time:—

Hydrochloric acid	1
Chloride of sodium	2.33
Sugar	7
Sulphate of magnesia	7
Albumen	49
Caromel	98
(Graham.)	

Diffusion of a mixture of 5 per cent. of chloride of potassium and 5 per cent. of chloride of sodium, for 7 days, at 12°-13° R.

		Chloride of potassium.	Chloride of sodium.	Total dif- fusate.
Stratum	1	.018	.014	.032
"	2	.025	.015	.040
"	3	.044	.014	.058
"	4	.075	.017	.092
"	5	.101	.034	.135
"	6	.141	.063	.204
"	7	.185	.104	.289
"	8	.252	.151	.403
"	9	.330	.212	.542
"	10	.349	.351	.700
"	11	.418	.458	.876
"	12	.511	.559	1.070
"	13	.552	.684	1.236
"	14	.615	.772	1.387
"	15	1.385	1.551	2.936
		5.001	4.999	10.000

In the upper portion of the table, chloride of potassium always appears in excess, but not in so large a proportion in the first three strata as the fourth. The first six strata contain together 561 milligrammes, of which 404 mill., or 72 per cent.—that is, three-fourths—are chloride of potassium. In the lower strata the chloride of sodium preponderates, and only at the tenth stratum is there an equilibrium. Prof. Graham remarks that "the preceding experiment might be so conducted as to diffuse away the chloride of potassium, and leave below a mixture containing chloride of sodium in relative excess to as great an extent as the chloride of potassium is found above in the last experiment." From this and analogous experiments the author concluded "that by repeating the diffusive rectification a sufficient number of times, a portion of the more diffusive salt might be obtained at least in a state of sensible purity."

When an experiment similar to the foregoing was conducted with salts of the same base, as the chloride of sodium and sulphate of soda, the separation was more apparent. The six upper strata contained 90.8 per cent. of the chloride of sodium, and the upper eight strata contained 83.9 per cent.

Heat appears to promote diffusion, but does not seem to facilitate the separation of unequally diffusive substances. At low temperatures, again, diffusion is proportionally slow.

It is certain, from the foregoing exposition, that, in connection with solution, there is a force upon which depends the diffusion of the particles of soluble substances through fluids, and that this force not only lifts them, but retains them in a state of diffusion in opposition to gravity and to the disposition which they have naturally by cohesive attraction to come together. This force is always in existence where soluble substances are in contact with the solvent, and, as is seen in the tables, there is a tendency to diffusion by which the particles of both the substance and fluid unite together. This tendency is only limited by the complete and thorough diffusion of the particles, which may move in all directions; consequently saline particles may move to aqueous particles, as well as aqueous to saline, by virtue of their mutual attraction. When thorough union is accomplished, there is an *equilibrium of saturation*, the solution then being

uniform in composition. When an equilibrium is established, the addition of new fluid will again produce attraction, which will commence where the solution and the liquid meet, and will not cease to exert its influence until there has been a thorough incorporation of particles. If a liquid has taken up all of a solid with which it can combine, it is said to be *fully saturated*; but where this point has not been reached, and complete diffusion has not taken place, the force continues in operation by which this will sooner or later be accomplished. It requires only time, or may be assisted by mechanical or other means. In the production of solution there may be said to be a tendency to *uniform saturation*.

The principles of diffusion connected with solution which have been presented have an important bearing upon the process of absorption, which takes place through membranes in the animal economy. The effect of interposed membrane between fluids which have the tendency to unite and diffuse themselves is but to retard the result, the extent of surface presented regulating the extent to which mixture can take place. When a tube closed with bladder and filled with brine is left for a long time with the closed end immersed in pure water, the amount of salt in the latter increases, while that of the brine diminishes, till, at last, the two liquids, separated by the bladder, contain the same relative proportions of salt and water. It was found by Mr. Graham¹ that common salt diffuses into water through a thin membrane of ox-bladder deprived of its outer muscular coating, at the same rate as when no membrane is interposed. We may perform the reverse experiment of placing water in a tube and immersing its closed end in a solution of salt or alcohol, when the saline or alcohol will penetrate to the water.²

Every membrane must be regarded as a septum of capillary pores, into which the fluids can penetrate. When on one side of a membrane a liquid is placed containing a substance (a saline for example) in solution, and on the other side water, a mixture is formed in the interstices of the membrane. This mixture is a diluted state of the saline solution, and occurs in consequence of the attraction between the saline particles and water. The tendency on the side of the water is to dilution in consequence of the attraction of the membrane for water, and on the side of the saline for concentration of the solution in the membrane in consequence of the attraction of the saline for the water, or its diffusive tendency. This force then overcomes the attraction of the membrane for the more diluted liquid. There is a struggle or alternation between the two forces, viz., the superior attraction of the membrane for the diluted fluid and of the saline to diffuse itself into this fluid, and concentrate it. These are alternately operative with a changing capacity on the part of the membrane, and hence the expansion and contraction which must attend the operation of osmosis. This diffusive attraction of the salt for the water is the true reason why the membrane yields its superior attraction for the water to an inferior one for the saline solution, it is the force which displaces the water or a diluted solution with the introduction of a stronger one into the membrane, giving rise to currents and suction. Through the membrane, then, the effort of equilibrium of solution is being accomplished, which is facilitated on the side of the membrane where imbibition most readily takes place, and is retarded on the

¹ Chemistry, p. 497, Am. ed.

² The specific gravities of the two fluids are in all these cases changed—that of the denser fluid becoming reduced, while that of the lighter is augmented until they nearly approximate.

side where there is the least penetration; hence the greater diffusion of the more easily penetrating liquid with an increase in the volume of the liquid towards which it is directed. This is the solution of the question of the apparent superior attraction of one fluid for another on opposite sides of membrane and of denser solutions attracting lighter ones.¹

The difficulty of explaining the introduction of articles into the circulation has arisen from the limited interpretation of osmotic phenomena presented by experiments with membranes. It has been supposed that a sensible increase in volume of fluid on one side or other, constituted the exemplification of osmotic action, and that this is under the control of affinities possessed by membrane. *The truth is that the mutual attraction between fluids, or of soluble substances for fluids, with the tendency to diffusion is the foundation of osmosis, and that the specific affinity of membrane for fluids is the regulator of the results which take place.* The first of these is the force which must enter into the calculation, while the latter is the modifying force by which phenomena are controlled. It is only by estimating these two forces jointly that the diversity of the effects manifested in the numerous experiments which have been made becomes intelligible.

It should be recollected that osmosis may take place both *with* and *without* increase of volume. This is an essential fact in the explanation of absorption, and where there is no increase of volume the membrane may be said to be *indifferent* or *neutral*. When a denser fluid is on one side of the membrane the current which is directed towards it is only for a time; it has its limit, and the limit is when a point of diffusion has been reached by an interchange of particles at which the membrane becomes indifferent. To a saturated solution of salt, half again of the volume will be gained of water in an endosmometer (200 parts will increase to 300), at which point the effect of the membrane appears to be lost. In this case the action of the membrane is exhibited when the surface of the membrane inclosing the saline is connected with the water by a single drop, which falls when the membrane becomes indifferent.

An exposition has already been given of the influence of pressure upon osmosis. Liebig has shown by a simple experiment that the force of attraction between a membrane and a fluid is equivalent to such pressure as can neutralize it. The experiment is performed by the pressure of mercury, which can be made to antagonize the force of attraction of the membrane for water, so that while the saline diffuses itself, there is no increase of volume. By neutralizing this force, the membrane becomes, as it were, indifferent, and takes no part in the operation, that is, becomes passive. What is equivalent to this may be produced by distension. A tube of membrane (a section of fowl's intestine) being filled with a solution of salt

¹ It has been remarked by Vogel, that where two fluids capable of being mixed are separated by a permeable substance, owing to the mutual chemical attraction exercised by the constituents of the one fluid on those of the other, both fluids will strive to become chemically equal, and this perfect admixture will always succeed as the final result of their being brought in contact, although in a shorter or longer time and attended by different accessory circumstances, whilst the volumes of the two fluids may either remain unchanged or the volume of one increase as that of the other diminishes. The only truly important practical point to be traced out in the arrangement of all experiments on this subject may be embraced in the following simple question: which constituents of the fluid *a* (as well with respect to quality as quantity) pass in a given time to *b*, and which pass from *b* to *a*? (Vogel, *op. cit.*, p. 98.)

when tied at both ends, and thrown into water, undergoes the introduction of the water into it. As the intestine becomes distended a pressure is produced upon the membrane which antagonizes the force of imbibition, and then diffusion of the salt externally goes on as if no membrane intervened. Neutrality is thus engendered.

The reverse of the preceding can also be brought about and the force of imbibition be converted into a true suction. If the membranous tube (intestine) be filled with water, then placed in a saline solution, and circulatory motion be given to the latter, in consequence of the continued renewal of the saline in contact with the exterior membrane, the water which has passed from the interior of the tube will be diffused away and rapidly given to the current. This will be equivalent to a renewal of the strength of the solution in contact with the membrane, and as the tendency is to the diminution of the current of imbibition by membrane in proportion to the fall in strength of the solution exterior to it, this is prevented, and a neutral state of the membrane does not occur.

In the accomplishment of osmosis it was assumed by Dutrochet that there is a stronger ingoing current (endosmotic) and a weaker outgoing current (the exosmotic). It has been shown by Liebig that saline and inferentially other matters, do not simply pass through membrane, without a certain amount of water, or, in other words, that these particles alone do not pass, but that there is an actual current. In liquids of different density the one placed above another, separated by membrane by colouring one of them the currents may be demonstrated.¹ The currents which are perceptible are not dependent solely upon diffusion, for in the process of concentration and dilution there is a corresponding process in the membrane of contraction and expansion; on the side of the saline or of alcohol there will be condensation and on the side of the water dilatation. The inherent elasticity of membrane conduces to these changes, and where there is an alternation of them there must be *continual motion*.

The point which constituted the anomaly in the phenomena of osmosis was the determination of the ability of fluids of higher specific gravity to pass to those of less specific gravity and even to increase their volume. That denser fluids should attract those of less specific gravity was regarded as the law and the reverse as an exception, not understood. In such an entanglement was Dutrochet and the earlier experimenters. In addition to the facts presented (page 137) the following may be given: When the two liquids are diluted sulph. acid sp. gr. 1.093 and water, the acid at 50 F. increases in volume; but if the acid be reduced to a sp. gr. 1.054, the volume of water increases. Diluted tartaric acid (11 parts to 89 water) and water mix through a bladder without change of volume, with more than 11 per cent. of the acid the volume of acid increases, with less, the water increases. It is evident from experiments that have been detailed that there is a density which is inimical to affinity for membrane, and hence the current in the direction of the fluid possessed of this density. Again, there may be a density which does not affect the affinity, so that to both the dense and the lighter fluids the membrane is neutral. In these cases the law of diffusion may prevail unimpeded, and there is an interchange without alteration in volume. Still further, there are substances which, when in solution, appear to have a superior affinity for membranes than water and a greater power of traversing them; thus oxalic acid which has a feeble power of saturation

¹ Liebig, op. cit., pp. 146-165, Am. ed.

even at that point passes to the water, and may even when added to other articles facilitate their passage, as for instance to sugar in solution. The same is the case with other acids when in solution below a certain sp. gr. as we have seen with sulphuric, tartaric, and citric acids.

It appears from experiments that a substance possessing the feeblest power of diffusion, or none at all, has little capability of being absorbed by and of passing through membrane, yet osmotic action may readily occur towards it. Thus albumen and other colloid bodies have comparatively a feeble diffusive power; and with respect to imbibition and exudation pure albumen possesses the least tendencies, which is an important circumstance, when its function in the operations of the economy is taken into consideration. It has been made obvious that with this feeble diffusive power, which is dependent upon the little comparative attraction between them and water, still the tendency of water to pass to colloids through membrane is very decided in consequence of the attraction of the water for membrane through which it passes to be imbibed by the colloid. If a clay cell or a glass tube secured by some animal membrane be filled with dried animal or vegetable matters, as fibrin, coagulated albumen, resin, mucus, &c., and put into a vessel of water, the water will penetrate through the membrane and pass from its inner surface to the substance chosen for the experiment, causing it to swell. Here no passage occurs outwards. The quantity of liquid which passes through the partition in a given time depends upon the superficies of the latter, upon the power of absorption by the interior substance, and upon its quantity. The same results will occur if instead of coloured substances some blotting paper or dried sponge be introduced into the tube, which simply exercise capillary affinity.¹

When a solution of gelatine, of gum, or of albumen is made of the specific gravity 1.07, and exposed to the action of water through membrane, it has been found that the increase of the volume of the solution of gelatine amounts to 3, of solution of gum to 5, and of albumen to 12, which last is greater than of sugar, which is 11. Albumen, as was stated by Dutrochet, has the highest power with reference to osmosis. This explains the readiness with which water and diluted solutions can enter the circulation, for when liquids (either water or solutions) have passed the membrane, the diffusive attraction is brought into operation, and they are disseminated through the colloid matter.

Albumen is the basic colloid material of the blood, which may resolve itself into other colloid matter, as fibrin, &c. When supplied with the due amount of water, it presents the appearance of other liquids. Most authorities have taught that albumen is soluble, and consequently that it can undergo osmotic penetration. In the normal condition Dumas regarded it as miscible with water in all proportions, and only insoluble when coagulated. Berzelius regarded it as soluble; M. Denis first affirmed its insolubility and that it be dissolved by aid of an alkali. It is remarked by Mialhe "that if albumen were soluble and endosmotic, it could not maintain itself in the circulatory system, but would constantly traverse the coats of the vessels containing it, and would diffuse itself in the organism and be lost in the products of secretion." Regarding the albumen of the serum and the white of egg as possessed of the same properties, M. Mialhe experimented with both of them relatively to their osmotic properties. The membrane of the egg was used, and whether the white of egg or serum was

¹ Vogel, op. cit., p. 97.

employed, he found that no albumen exuded from the interior, although water and salines penetrated to the interior. When water is used externally, all the salines in connection with the albumen are diffused through the membrane to that liquid. Water penetrates freely to albumen in an egg so as to burst the capsule in a few hours. Mialhe found that an egg weighed 2.5 grammes more (38 grains) by the absorption of water through its denuded capsule.

The absorption of substances, whether of a nutrient or medicinal nature, must be accounted for upon the principles of osmotic penetration. The blood which circulates in the capillary vessels is rich in albumen and colloid material, through which water and such articles as are held in solution can be diffused, while it also contains salines which have an affinity for water. The power of absorption varies in the several tissues depending upon their vascularity and physical structure. There is, moreover, an element to be considered in appreciating the rapidity of absorption, which is the maintenance of the current of the circulation—were not the blood in motion, the result of endosmosis in the vessels would be very limited in amount. It is by the constant action of new liquid in the vessels, in connection with outside solutions, that absorption is maintained. It can be easily understood, therefore, that imbibition goes on, other circumstances being favourable, in proportion to the freedom of the capillary circulation. Should this be clogged or in a static condition, an impediment is presented.

In connection with absorption there are two separate acts, *imbibition* and *transmission*. By the first the fluid substance enters the bloodvessels, and by the second it is diffused, and by the circulation of the blood is directed to the heart and to the several organs of the body. As has been explained in discussing the forces by which osmosis is accomplished, the first act in the introduction of liquid into the circulation is in accordance with the affinity of the liquid for the membrane. Water can easily penetrate, and then being diffused through the albumen will circulate with it and the salines. But the question arises with respect to saline and other solutions. The same law must hold here as with other membranes. Although the capillary vessels have less affinity for saline solutions than for water, still they will penetrate in proportion to their dilution, and the difficulty of introduction will augment in proportion to the increase of their strength. By those writers who adopted the explanation derived from the experiments of Dutrochet, great stress has been laid upon the necessity of a liquid which enters the circulation being of less specific gravity than the blood. This, however, resolves itself into the greater facility with which dilute solutions can become obedient to osmotic action. The sp. gr. of the blood is 1.028, and it contains from three-fourths to one per cent. of saline matter, so that liquids of less specific gravity will be more likely to enter the vessels and be diffused, but as has been shown, for instance with respect to acids, this is not an invariable law. It is not the denser solution within the vessels which attracts the liquid without, but the lighter external liquid possessing a greater facility of penetrating the vessels, and after having penetrated of diffusing itself by the attraction between it and the liquid within. If the liquid on the outside of the vessels have a higher sp. gr. than the blood, there will be a greater difficulty of introduction into them, *but not an exclusion*; a certain quantity, though less in amount, will be imbibed by the vessels, and from them be yielded to the watery and albuminous elements of the blood; indeed, as a colloid, the albumen becomes a medium of liquid diffusion like water itself. The same explanation applies

to alcohol and ether, which in the concentrated state have little penetrating power from the feeble affinity for membrane, but acquires both by dilution.

Dr. Graham uses the term *dialysis* in its application to the method of separation by diffusion through a septum of gelatinous matter. If a solution of salines (or crystalloids) be on one side of a septum and water on the other, the tendency will be for the passage of the salines to the water, and an equalization of saturation. This will be facilitated by motion.¹ In the same way, other articles may be diffused by dialysis. If the blood, a solution weaker in salines, then be separated from a stronger solution of them, there will be a tendency to the same equalization by dialysis into the vessels, there being a constant change in the strength of the fluid circulating in them. This introduction of solutions is not confined to a single one; several articles may be dissolved in the same fluid, and as has been shown by Prof. Graham, may be jointly diffused so that it is as easy to understand the entrance of a compound solution as of a single one. In the same way may be explained the separation of the soluble composite elements of the food in the process of primary nutrition. A selection is thus effected.

Some interesting experiments, proving and illustrating the agency of the circulation, were performed by Matteucci. If a living frog be immersed by its inferior extremities only in a solution of ferrocyanide of potassium, and the animal soon after be killed, scarcely any traces of the salt can be detected in the muscles of the legs and thighs, whereas the heart and lungs give very distinct evidence of it when touched with the chloride of iron. If the animal be kept for several hours in the solution, then the viscera will be penetrated by it through the circulation; but if the animal be killed, and the hind legs immersed for a short time, the heart and lungs will not be more imbued with the salt than other parts of the body. In explanation of these experiments, he states that—

“The solution was introduced into the body of the frog simply by imbibition, and this phenomenon, being effected in the living as well as in the dead frog, certainly cannot be regarded as different from the imbibition that has been presented, which belongs both to organic and inorganic bodies, and which is the consequence of these cellular and vascular structures. But there is something more than this. In the heart and lungs of a living frog we find a much larger quantity of the absorbed solution than in the other parts of the body, although these latter were much nearer the part immersed. The viscera mentioned are the centre of the circulatory system; in them commence or terminate the trunks of the bloodvessels; the solution of ferrocyanide, therefore, penetrates the bloodvessels by imbibition, becomes mingled with the blood, thus arriving at the heart and lungs.”

Another simple experiment proves the same facts. If two frogs are taken,

¹ An experiment bearing upon this point by Pousseuille may be stated. Phosphate of soda in a four per ct. solution being placed in an endosmometer and serum external to it, the solution augmented from 18 to 30–34 millimetres—after nine hours it stood at 20, and in fifteen hours at 8 millimetres. The membrane had ceased to osmose on the second day, but by shaking the endosmometer and agitating the serum the layers of liquid in contact with the membrane were altered and the osmose was renewed, the column mounted to 4 millimetres in an hour and then fell to 1. The serum of the vase was replaced by distilled water, when endosmose was renewed, and the column mounted in an hour to 54 and 60 millimetres, then in four hours fell to 54 and 48 millimetres. On the sixth day the membrane had not lost its power. This experiment is an illustration of the difference between ingoing and outwardly flowing currents, depending upon the capability of membrane. (*Comptes Rendus*, 1843.)

and from one the heart be removed, it will be found that both are active. Now, upon placing both in a large glass, containing a solution of extract of nux vomica, the animal with the heart is soon poisoned and long before the other becomes affected.

That permeability exists in living tissue, irrespective of circulation, was proven by an experiment recorded by Prof. J. K. Mitchell in his paper on the *Penetrativeness of Fluids*.¹ He there states that while engaged in investigating Magendie's theory of venous absorption, he coloured the diaphragm of a living cat blue by placing a solution of prussiate of potassa on one side, and that of sulphate of iron upon the other.

The physical conditions requisite for vital absorption are:—

1. A vessel or structure with organic sides or walls.
2. An exterior liquid capable of being imbibed by the tissue composing the walls.
3. An internal liquid, also capable of being imbibed by the walls, of intermixing with the exterior liquid, and of circulating in the vessels more or less rapidly.

From the *first essential condition* it is evident that the facility of absorption in different organs depends upon the vascularity that is present, as well as upon the flaccidity of their tissue, and the conducting property of the parts composing them. Where the greatest vascularity exists, there are the greatest number of points of imbibition, as well as a more active circulation to carry away the matters that have been absorbed. The lungs possess this power to a greater extent than any other organs, because more vascular, more delicate in texture, and having a shorter round of the circulation. The cellular tissue, on the contrary, while having the power of imbibition, is not provided with so active a circulation, and hence absorption is slower. By removing the cuticle from the skin, substances may be brought more directly in contact with the vessels, and absorption be facilitated. Mucous membrane readily permits the passage of liquids. That of the stomach of the dog, the cat, and the lamb, and the bladder of the ox were employed by Matteucci and Cimma in their experiments. The position favourable for endosmotic action was from the interior to the exterior surface. The vascularity of the mucous membrane of the alimentary canal and its great extent of surface will account for the facility possessed by it of absorbing water or fluids composed of substances in solution.

With respect to the *second condition*, an external liquid capable of being imbibed by tissue, it may be assumed that all substances, in order to secure their introduction, must be in solution, and that solid substances, no matter how finely reduced, are precluded from entrance into the tissues by imbibition. Solid articles, which are insoluble in water, are constantly employed as medicines; their exhibition being followed by decided effects upon the organs of the economy, it is clear that such articles are transformed into soluble matter by the chemical reaction which takes place between them and other elements with which they are brought in contact in the organs. A knowledge of chemical changes in the presence of other bodies has enabled us to explain the results which are obvious in such cases.

With reference to the *third condition*, it is well known that the blood fulfils all the requisites presented; its water and matters in solution are capable of being imbibed by the walls of the vessels, of intermixing with the exterior liquid, of receiving accessions from it, and of circulating in the

¹ American Journal of Medical Sciences, Nov. 1830.

vessels. The freer the circulation the more rapid the absorption, and hence a greater absorbing power exists in the veins than in the lacteals or the lymphatics.

While the blood circulates in the vessels with a given velocity, the walls of the vessels are, in the normal state, far less permeable by it than by the other fluids of the body. Should the volume of the blood increase by absorption, it is counteracted by the antagonizing action of the kidneys and other emunctories.

In estimating the circumstances favourable to the passage of fluids through membranes, it should not be overlooked that pressure is conducive to such effects. How far pressure is conducive to endosmotic action, as it is derived from the actual weight of the atmosphere, has not been determined, but it is very clear that pressure is operative in exosmotic phenomena, as is illustrated in the exudations and effusions that take place in organs. Many substances, as, for instance, the thinner animal membranes, are expanded by the pressure of the column of fluid resting upon them, and thus their efficient surface is increased, while their texture is changed, their thickness diminished, and their pores enlarged.

From the foregoing exposition of absorption we may arrive at the following conclusions:—

That the introduction of fluids containing dissolved substances is due—

1. To the force of capillary attraction which exists to a greater or less extent between membranes and fluids, which modifies the result and renders the process easy or difficult.

2. To molecular or chemical attraction between fluids of different specific gravities which are capable of being commingled and becoming homogeneous.

3. That absorption is aided and rendered active by the circulation in the vessels by which the fluids interested are constantly changed in their relation to each other.

That there are certain forces in operation in connection with cell action that must have an influence in controlling the introduction of substances becomes apparent when the difference is adverted to of selection of articles by different vessels in the same structure. Thus, oil or fatty matters when worked into emulsion or chemically altered are preferably taken in by the lacteals, while sugar and other like articles are readily absorbed by the veins. There is no doubt that these forces are not distinct from those which regulate absorption in general, and are dependent upon the same principles of explanation.

In opposition to the opinion that medicines enter the circulation, it has been alleged that their effects are produced so rapidly as to preclude the possibility of their being absorbed. The point in question has been carefully examined by Mr. Blake,¹ who arrived at the conclusion that the rapidity of the action of a poison was in proportion to the rapidity of the circulation. He found that an interval, always more than nine seconds, elapses between the introduction of a poison into the capillaries or veins and the first symptoms of its action. In dogs, a substance which does not act on the capillary tissue passes from any part of the vascular system back to the same part again in from twelve to twenty seconds. Prof. Helsing, of Stuttgart, found that the time which a solution of ferrocyanide of potassium, injected into the jugular vein, requires to reach that of the

¹ Edinburgh Med. and Surg. Journ., vol. 53, p. 24.

opposite side, was in various experiments from twenty to thirty seconds.¹ With reference to prussic acid, Dr. H. Meyer determined by his experiments that killing by this poison, although a rapid process, is by no means so instantaneous as formerly supposed, generally only after the lapse of one minute and a half, and it is well known that this is one of the most rapid of poisonous articles.² The argument, therefore, against the introduction of sedative poisons, based upon the time of their operation, has no intrinsic force.

J. C.

ART. XXI.—*Medical Errors. Fallacies connected with the application of the Inductive Method of Reasoning to the Science of Medicine.* By A. W. BARCLAY, M.D., Cantab. and Edin., Fellow Roy. Coll. Phys., Physician to St. George's Hospital, &c. &c. 12mo. pp. 123. London: J. Churchill & Sons. 1864.

AN extensive subject is here presented; capable of occupying a much larger volume. Medical errors form *pars magna* of medical literature. Diogenes could hardly need to search longer for a man in Athens, than Stuart Mill among medical writers for a logician. Is it not the principal advance of the last century, that we have been relieved of many errors which, if they did not rule medical practice, at least burdened it greatly? A natural effect of the discovery of those errors, and of the unscientific basis of much prevailing practice, has been an era of medical scepticism, in which we now live. It is, therefore, of the utmost importance that a positive science of medicine shall be re-constituted of the materials within reach of the profession. Induction is undoubtedly essential for this reconstruction. That its principles and methods, at once scientifically correct and practically available, should be understood by all medical students, practitioners, and teachers, is of great consequence.

Dr. Barclay has, in his published lectures, strongly asserted this, and has well illustrated it by examples. It may be regretted, however, that he has not been quite so felicitous in his discussion of the philosophy of the subject. To those who have read H. Spencer, Mill, Baden Powell, and Whewell upon similar topics, much is missed of the clearness with which, even with diverse views, those masters of the logic of science deal with it.

Such a criticism ought not to be made without some citation to justify it. Much of his language is clear and correct, but sometimes words are used in a manner liable to create confusion. Thus (p. 10) :—

“While it is quite true that the hypothesis is very often suggested to the mind of the accurate observer by some harmony which arrests his attention, it is nevertheless true that in many cases it is a mere deduction; and in most of those which are classed as the highest inductions, there is a combination of both forms of reasoning, often united with an idea which is not the fruit of any reasoning process whatever, but is simply the bright offspring of genius.”

Without an example of such a “bright idea”—which our author does not give—we are unable to imagine, among familiar instances of discoveries by induction, what part of any of them can be regarded as apart from

¹ Pereira, *Elements of Mat. Med.*, vol. i. p. 154.

² *London Medical Times*, vol. ix. p. 432.

"any reasoning process whatever." Is it not commonly understood that the genius of Kepler, of Newton, or of Dalton, was a genius *for* reasoning?

Objection is made by Dr. Barclay to Prof. Laycock's stated principle, that medical theories are to be grounded on analogy, all their analogies having reference to one fundamental principle, which is stated to be "the unity of structure and function of organisms in time and space." This Dr. Barclay regards as not rightly called an inductive, but a deductive principle, indeed "an *hypothesis* assumed *a priori*, every argument based on it partaking of its hypothetical character." We hold that this ranks Dr. Laycock's principle at least as much too low as he may, perhaps, have placed it too high as a foundation of medical philosophy. The unity of structure and function of organisms is, as a proposition, itself the result of the largest induction. It is the major premise of every syllogism in physiology, pathology, and therapeutics, as the yet larger one of the *uniformity of nature* is held by Baden Powell¹ to lie at the basis of all science, being deposited there by the aggregate labours of observers in all departments; at once the result and the instrument of all induction.

Disadvantage belongs, it appears to us, to the use of the terms "empirical law," as applied by Dr. Barclay; or, again, "empirical law of limited significance" (p. 54); "difference between the laws of nature and empirical laws" (p. 61); "laws of the highest class, which absolutely govern matter, while those of the lowest class are only observable on special occasions, apply to a few individuals, and are liable to constant interruption," &c. (p. 60). Evidently there is here a twofold employment of the word "law," which *ought*, in science, to mean absolute fact, or invariable sequence—the relation in reason of certain things or events; but which he makes sometimes also signify the *statement* or *knowledge* of facts proved, or even only supposed to be shown, on an incomplete induction—mere approximations or hypotheses, not laws at all. These may vary, or be more or less absolute; laws *really* ascertained cannot, though our knowledge of them on complex subjects may often be very imperfect, and we cannot always at once explain exceptions to recognized laws by their conformity to others not understood.

Some will urge, too, that Dr. Barclay gives to the idea of *causation* too dominant a position in his theory of induction, while at the same time he employs it obscurely. Sparing the metaphysics of such a discussion, we must simply quote a few lines from a page (p. 58) intended to make clear "what is a correct induction."

"Let us endeavour, before we proceed further, to ascertain what is meant by the term 'law.' In few words, it is an expression of the mode in which any given cause operates to produce a certain effect."—"It is not at all of the essence of a law to explain the production of any phenomenon, although it may greatly contribute towards such a result."—"We know nothing of the cause of gravitation, although there is no subject of which the laws are better understood. By the discovery of these laws, a great step was made towards an explanation of the causes which govern the motions of the heavenly bodies. In this we have an instance of the most elementary law with which we are conversant, and yet one which offers not the very least explanation of the cause which produces the effect."

In this we do not deny that our author's meaning may be apprehended, but it must be contended that it is not consistently expressed, nor can such language aid much the ratiocinations of a beginner in inductive philosophy.

¹ Essays on Inductive Philosophy, Unity of Worlds, &c., p. 98.

Dr. Barclay's consideration of the subject of "averages," though not always free from ambiguity of expression, is, mainly, very judicious. Algebraic calculation exhibits startlingly the necessity of a large number of cases to prove anything whatever clinically by mere statistics. When there are, for example, only four circumstances supposable whose presence or absence may determine a more or less favourable tendency in a series of cases, the variations possible, and which must be allowed for, are fifteen. With five such circumstances, the variations amount to thirty-one; with ten, to more than one thousand; with fifteen, to thirty-two thousand, and so on, and yet the following is not an over-statement of the circumstances to be taken into the estimate in all clinical observations.

"First, before the attack, the sex, age, and social position of the individual; his previous state of health, including early constitution, acquired habit, and the effect of the relative amount and purity of food and air; his actual condition, whether suffering from any minor ailment (to say nothing of major complications, which may be excluded), from actual privation or cold, or from any recent excess. Secondly, as regards the seizure itself; its immediate cause, its intensity, the rapidity of its development and progress, and the extent to which the special organ attacked is affected by it. Thirdly, the circumstances external to the patient influencing the progress of the disorder, such as his home, the means at his command, the friends that surround him, ignorant or well-informed, his nurse and his food, including stimulants as well as other nourishment; the skill of his medical attendant, and the judgment with which other subsidiary remedies are employed; if necessary, the influence which the conditions calling for their employment exercise over the disease, no less than the remedies themselves; and, perhaps more than anything else, the discretion with which the amount of stimulants is strictly limited to the exigencies of the particular case. Lastly, the wonderful and inexplicable influence of mind over body, the condition of hope or fear, of quiet confidence or restless anxiety." (p. 36.)

Well, indeed, then, may it be said of clinical facts, as it has been of experimental results in another department, "*non numeranda sed ponderanda.*" The practitioner goes through a frequently unconscious analysis of all these varying circumstances, in his estimate of cases occurring under his eye. His experience is worth more or less, according to his power to do this well or ill. But, when the thread of the facts is truly seized, when a "relation in reason" is found, one case to a gifted medical mind may be worth almost as much as a thousand to the mere routinist, or even to the mere statistician. Thus it is that the aggregate experience of the past in practical medicine has accumulated much that is invaluable and permanent with much, also, that is, or was, provisional only. It is as great an error to discard all of the former as to adopt all of the latter. Dr. Barclay does not appear to us to do quite full justice to therapeutical experience as of itself a basis for legitimate induction. "Empirical practice," says he (p. 35), "appeals to no laws, is guided by no analogies, rests on no principles, but simply asserts that experience teaches the benefit of the plan proposed. On no better grounds rests the ordinary saline treatment of fevers, &c."

We would hold that no better ground can be asked for on behalf of this or any other treatment, when it is shown that experience, carefully weighed, really does teach the benefit of it. That is the great question; its explanation comes afterwards. When that is simple, and obviously included in our knowledge of laws before ascertained, as in the case of chemical antidotes to definite poisons, all is rational as well as experimental. But who does not know that nine-tenths of what is really valuable in medicine was first discovered, often by accident, and, if explained at all, this followed

long since? How much is owing, at last, to what Dr. Barclay calls "deductive reasoning" upon physiological or bare pathological facts? Perhaps enough, and no more, to prevent our adopting altogether the maxim ascribed to Trousseau, that "rationalism in medicine conducts only to absurdities." Dr. Barclay must, however, be credited with a full exposition of the application of direct observation and experiment in therapeutics, in the instances of the cure of ague by bark and its preparations, and of vaccination.

The most valuable as well as the larger part of the volume before us is occupied with examples of fallacious reasoning upon special medical or collateral subjects. Even reports made upon returns given to the British Medical Association appear to be open to animadversion on this ground. To the first of these therapeutical inquiries the name of Prof. Bennett, of Edinburgh, is attached.

"The reporter on acute pneumonia is well known to have expressed very decided opinions on the treatment of this disease. He even goes so far as to say that it is reasonable to conclude that the difference in the mortality between his own cases observed in Edinburgh and those of M. Louis in Paris 'was owing to the treatment, and that such is a legitimate application of statistics.' We may well ask what the numbers were which gave such remarkable evidence; they are 65 on one side of the Channel, and 75 on the other! In reply to this argument it is only necessary to cite the experience of other observers who have had a very much smaller mortality than Dr. Bennett; for surely he is in all fairness bound to admit that a man who only loses one patient in 60, or another who has actually only one death among 90 recorded cases, must have discovered a mode of treatment better than his own. Statements to this effect are made by a writer who has collected the largest number of statistics which I have met with on the subject; and it is very remarkable that though the cases just referred to are included among those in which venesection was not practised, yet the statistics fail in showing the advantage of abstaining from bleeding in pneumonia. The cases in which bloodletting formed one part of the treatment gave a death-rate of 164 in the thousand; while 10,000 cases treated almost entirely without venesection gave a death-rate of 203 in the thousand, not including the army statistics, which give only a death-rate of 39 per thousand during twenty years, when moderate bleeding was the rule of practice." (p. 49.)

Another therapeutical inquiry of the same Association is alluded to, in regard to the treatment of tape-worm by the oil of male fern. It is remarked that while no doubt can exist, upon inductive evidence, that this remedy will generally expel the parasite, statistics might have been made, with more advantage, to prove its *comparative* efficacy; whether it or kousso, for example, fails most or least frequently. Moreover, some light might thus have been thrown upon the causes of its failure in certain cases.

The treatment of non-syphilitic psoriasis, and that of scarlatina, as considered in other similar reports, are not regarded by our author as having been thereby greatly elucidated as yet; although the latter may gain somewhat of importance hereafter by the extension of the inquiry to a large series of cases.

The recent doctrine of "syphilization" is well contrasted by Dr. Barclay with that of vaccination; the latter affording a splendid example of successful induction, the former of futile hypothesis. As the preventive action of vaccination harmonized well with other known facts, and was itself suggested by observed instances, it needed but a few experiments to afford it a demonstrative support; while syphilitic inoculation as a conservative measure, finding no clear analogy, nor positive fact to father it, must die

almost stillborn, after a few failures, notwithstanding some promising coincidences. A similar fate, too, belongs to the idea of the use of belladonna as a prophylactic for scarlet fever, and of *sarracenia* as a cure for smallpox.

Acute rheumatism has been subjected to more experimentation, as well as hypothesis, than most maladies; though as yet without wholly satisfactory results. The same is remarked of pulmonary consumption. Dr. Churchill's method of treatment by the hypophosphites is "ruled out" by our author, we think very properly; valid evidence not having been afforded of its efficacy. For this, two series of cases should have been taken, as nearly alike as possible on all variable points; one set having employed the remedy under trial, and the other not. The number of deaths, in a term of years, in each series, and the number of recoveries, might give us some definite estimate of the value of the medication proposed.

Cholera has also been made the subject of many experiments, rational or irrational in their suggestion; often purely empirical. The investigations made by authority of the London Board of Health and Royal College of Physicians, as embodied in the report of Drs. Baly and Gull, appear to show that, urgent as are the claims of many for particular modes of treatment, "no induction has yet been established, indicating that any remedy possesses curative powers in cholera."

Dr. Barclay goes beyond his own rules of strict evidence in asserting without qualification (p. 94) that cholera is a disorder "derived more or less directly from another individual whose tissues have been similarly diseased." Further on in the volume he resumes the topic of the etiology of this disease, as illustrating inductive principles (p. 107). Dr. Baly's only generalization was that cholera is propagated by human intercourse, and that certain unknown causes aid or limit its transmission to particular persons. This our author calls "an empirical law." He adds that Dr. Snow's hypothesis in regard to the nearly universal transmission of the morbid element through drinking-water was essentially limited by facts brought to bear against it by Dr. Baly and others, showing that such is only *one* of the modifying influences affecting cholera. Dr. Barclay overlooks a larger generalization, first distinctly enunciated in this country,¹ which includes *all* of those influences, leaving as unknown only the specific morbid cause which gives to this epidemic its entity. This is, that *animal decomposition*, in any and every form, is the great *promotive* cause of cholera; acting only with the migratory specific cause, but determining, as to that, its direction and extent of propagation.

Dr. Todd's "supporting treatment," as applied by him, in theory at least, to all acute diseases, is well commented upon in the work before us. It is shown that a series of fallacies is woven through the whole argument on behalf of that theory and practice. Were it even granted that support is in all disease the most important indication, it does not follow at all that alcohol must be preferred for giving that support; nor is its use in such a mode, beyond what all practitioners have long agreed upon in certain cases, proved, by Dr. Todd's own statistics, to deserve confidence. As quoted by Dr. Barclay, of eighteen of his cases of rheumatic fever, fifteen are reported as having cardiac complication; and of continued fever, in twenty-four recorded cases, fully stimulated, eleven were fatal.

"In therapeutics," as our author says, "fallacies, from the misapplica-

¹ Philada. Medical Examiner, Aug. 1855; cited in British and Foreign Medico-Chirurgical Review, Jan. 1857, p. 62.

tion of the inductive method of reasoning, are very numerous." Perhaps there is something saddening in the view given in such a work of the great prevalence of medical errors. But it is a satisfaction at least to know that the profession is well awakened to the need, for its uses, of a positive science. The task now most pressing, for clinical observers, appears to be, to show that such positive science is possible; that facts in the action of remedies, in the modification of disease, are just as truly and substantially facts as those of chemistry, normal physiology, or vivisection; and that they may be relied upon, when well established, for that which we all yet hopefully labour for, however slow its progress—a really inductive science of medicine.

H. H.

ART. XXII.—*Medico-Chirurgical Transactions*. Published by the Royal Medical and Chirurgical Society of London. Second series. Volume the twenty-ninth. 8vo. pp. 447. London, 1864.

THIS volume contains twenty-four original communications. As abstracts of fourteen of these have been given in the numbers of this Journal for last year, we shall devote attention mainly to the other papers.

I. *A case of cancerous infiltration of the penis, with cancerous ulcer of the bladder, and secondary deposits in the lungs, bones, and other parts of the body*. By HOLMES COOTE, F.R.C.S., &c.

A short abstract of this case is published in the number of this Journal for January, 1864. It is a remarkable case, on account of the rarity of true infiltrated scirrhus elsewhere than in the mammary gland.

II. *Case of a mucous cyst on the laryngeal aspect of the epiglottis successfully treated by incision*. By ARTHUR E. DURHAM, F.R.C.S. Communicated by JOHN BIRKETT.

An abstract of this case is published in the number of this Journal for January, 1864. It may be added that the patient's difficulty of swallowing was first experienced immediately after a severe attack of sore throat, under which he had suffered two years previously to undergoing the operation by which he was so instantaneously relieved.

III. *Case of unusual difficulty in lithotomy arising from great distortion of the pelvis by rickets*. By HENRY THOMPSON, with a note by JOHN ERICHSEN, Esq.

This case is that of a boy, aged $4\frac{1}{2}$ years, from whose bladder, by the median operation of lithotomy, a stone was removed one and one-eighth inch in length, seven-eighths of an inch in breadth, and five-eighths of an inch in thickness. On the third day the patient died, after the usual symptoms of peritonitis.

At the post-mortem examination the upper outlet of the pelvis was seen to present an irregular heart-shaped figure, obliquely cordate; the sacral promontory approached within three-eighths of an inch of the left pubic ramus, within barely five-eighths of the right, and barely seven-eighths of the symphysis pubis. These measurements are those of the dried bones.

Mr. Erichsen's note relates the operation performed by him some ten weeks previously upon this patient, when finding that the calculus could not be extracted in the usual way by ordinary instruments, and that it was too

hard to be broken up by the forceps and extracted piecemeal, he thought it prudent to desist.

A plate accompanies this paper representing the pelvis of the patient and the stone extracted.

IV. *Account of some unusual occurrences during the cure of a popliteal aneurism.* By CHARLES H. MOORE.

V. *Case of popliteal aneurism successfully treated by flexion of the knee.* By ARTHUR E. DURHAM.

VI. *Some particulars of a case of popliteal aneurism cured by flexion of the knee.* By the late H. C. JOHNSON, narrated by ERNEST HART. (Communicated by John Birkett.)

VII. *Note on the application of indices to aneurismal clamps and other pressure instruments.* By ERNEST HART. (Communicated by John Birkett.)

XVII. *Account of a case of aneurism of the abdominal aorta which was cured by compression of that artery immediately above the tumour.* By WILLIAM MURRAY, M.D.

XIV. *On a new method of procuring the consolidation of fibrin in certain incurable aneurisms.* By C. H. MOORE. *With the report of a case in which an aneurism of the ascending aorta was treated by the insertion of wire.* By CHARLES MURCHISON, M.D.

VIII. *Clinical observations illustrating the effects produced by the implication of branches of the pneumogastric nerve in aneurismal tumours.* By S. O. HABERSHON, M.D.

These seven papers are placed together in order to facilitate their consideration.

In Mr. Moore's case the aneurism was in the calf, under cover of the highest part of the gastrocnemius. Flexion of the knee was first employed, and continued for eight days; it was then abandoned on account of the pain it produced along the posterior tibial nerve. Any position of the knee which influenced the beat of the aneurism eventually produced insufferable torture in the sole of the foot. The mode by which the knee was flexed is not given. For seven weeks instrumental compression was employed, two tourniquets being used, one over the artery in the groin and the other on the thigh; effective pressure was made by them for from ten to fourteen hours a day. By digital compression the pulsation in the aneurism was finally arrested. In the course of the treatment, iodide of potassium was administered for eighteen days, one and a half ounces being taken. The effect of the drug appears to have been to increase the frequency of the arterial pulsations, and consequently the tension of the tumour.

In Mr. Durham's case the tumour was situated rather in the upper part of the right popliteal space. Here flexion of the knee succeeded perfectly. On examination on the fourth day from the fair commencement of the treatment, no pulsation was felt in the tumour. Severe pain was felt only for the first two days of the treatment. At the beginning the knee was bent as far as was deemed expedient, and the foot placed in a kind of slipper, which was attached by a heel-strap to broad bands passed round the thigh and pelvis. This is the plan recommended by Mr. Spence, in the *Edinburgh Medical Journal* for November, 1858. So much pain was caused by this that it was discarded before the expiration of twenty-four hours, and the plan recommended by Mr. Hart adopted. The limb was bandaged from the toes to within a short distance of the knee and carefully flexed. A large pad of cotton wool was placed over the aneurism

and in the flexure of the joint, and the roller was then carried round the thigh. The thigh was, of course, flexed on the pelvis, and the whole limb supported by pillows. Every day the flexion was slightly increased, a fresh roller being placed over those already applied, which were not interfered with.

In Mr. Johnson's case, narrated by Mr. Hart, flexion of the knee in the way just related was successful in producing consolidation of the tumour at the end of six days. Pressure by the tourniquets had been tried, ineffectually, for nearly three months, and Mr. Johnson was on the point of ligating the femoral artery, when flexion of the knee was fortunately suggested. We regret that the exact situation of the tumour, in this case, is not stated, as this must have considerable influence upon the success of the method. Flexion of the knee has been successful in at least thirteen cases, treated by British surgeons, since 1858.

Mr. Hart describes an aneurismal instrument he has had made, and of which he appends a woodcut, where the pressure is registered by a needle on a scale. It is effected by a strong spring, which affords an elastic pressure capable of nice graduation from four to twenty pounds. The instrument has already been tested in practice, and works well. The application of indices to instruments for curing aneurism by pressure is likely to obviate much of the difficulty attending instrumental compression and to remove some of the principal causes of failure.

The case of aneurism reported by Dr. William Murray, of Newcastle-on-Tyne, is one of the most extraordinary on record. The patient (Mark Wilson) was a spare man, twenty-six years old, whose symptoms first showed themselves after a hard day's work nearly a year before Dr. Murray saw him. His condition then was as follows:—

“His abdomen is somewhat spare, so that a distinct pulsation can be seen to the left of and slightly above the umbilicus; the pulsation is most distinct during expiration. On applying the hand, a hard, slightly movable pulsating mass, of a distinct globular form, is to be felt extending from about two inches to the left to about one inch to the right of the umbilicus, and upwards to within three inches of the margin of the left lower ribs. The pulsations in it are very strong, and impinge upon the hand with a sudden stroke, and the expansion of the tumour very distinctly separates the hands when applied to it. The tumour is of about the size of a very large orange. The impulse conveyed to the hand, when laid on the upper part of the tumour, is almost as strong upwards as it is downwards, when felt by the hand applied below the tumour. When pressure is made on the aorta above it all pulsation ceases, and when the pressure is removed a distinct thrill is felt to accompany the rush of blood into the tumour. A line drawn across the abdomen over the umbilicus touches at either end the margins of the last ribs, and incloses between the free borders of the ribs a triangular space (the epigastric region); over the left half of this space there is room enough to compress the aorta against the spine. The aorta below the tumour can be felt, and its pulsations seem in no way to vary from their normal character. By auscultation a feeble bruit can be heard over the tumour. The patient is in good general health; his bowels are subject to occasional attacks of constipation, sometimes being open every day, at others only once in two or three days, which may to a certain extent be accounted for by the large quantity of opiates he has taken to relieve the acute pain which he has suffered. His arterial system is free from evidence of degeneration.”

The man was examined by a large number of medical men, and by all of them the diagnosis of aneurism of the aorta was verified.

All palliative treatment having failed to afford relief, Dr. Murray determined to apply a tourniquet above the tumour, and thus attempt to

cure it by compression. An ordinary horseshoe tourniquet, made so as to open rather wider than usual, and thus to grasp the trunk of the body, was found when accurately applied to stop pulsation in the aneurism. Dr. Murray thus relates his proceedings :—

“On Saturday, April 16th, the patient was put under chloroform. (Having lately administered chloroform to a patient for fifteen hours without any apparent injury, I had no hesitation in making a prolonged use of it in this case.) The anæsthetic influence was accordingly kept up for two hours, during which time, except during momentary displacements of the instrument, the pulsation in the aneurism and in the vessels of the lower limbs was completely arrested. On removing the pressure no visible effect had been produced; but he passed no urine for nearly thirty hours. It was found exceedingly difficult to keep up steady pressure, as the patient, being under chloroform, unconsciously moved about a good deal; the irregular action of the muscles of expiration in the abdominal wall added very much to the difficulty, and it became necessary to sit constantly with one hand on the screw of the tourniquet and the other on its anterior or applied blade, and thus to secure the constant pressure required. On neither occasion when the pressure was applied did we escape a considerable number of recurrences of the pulsation from displacements of the instrument. This statement, however, does not apply to the last hour of the second and successful attempt, during which all movement and pulsation were completely arrested.

“On Tuesday, April 19th, after much entreaty on my part, the patient again submitted to be put under chloroform. Dr. Heath having carefully re-examined the tumour, and expressed his conviction of the nature of the disease, the tourniquet was applied, and pulsation in the tumour completely arrested. With the assistance of Drs. Nesham and Spencer, and Messrs. Armstrong and Powell, the pressure and the insensibility were kept up for about five hours. Until the last hour the slightest movement in the tourniquet showed that pulsation in the tumour had not ceased, and that the disease was unaltered. During the last hour the existence of pulsation became less obvious. It was then deemed prudent, lest the patient's strength should be exhausted, to remove the pressure and see what had been accomplished. On finally removing the pressure very slight pulsations were felt, and hopes were entertained that some advantage had been gained. As the femorals did not beat during the application of pressure, the extremities had become cold; and when the patient recovered from the chloroform a fit of shivering occurred. Hot bottles were applied to the feet, and hot brandy and water was given, followed in a short time by a large dose of a mixture of chlorodyne, opium, and belladonna, containing about *ziss* of the tincture of the last drug, which I find is a perfectly safe dose as an anodyne when combined with an ordinary dose of opium. In the evening he was found restless, and ‘sore all over,’ with tenderness at the seat of the aneurism and of the pressure, and numbness of the extremities. To my astonishment the tumour was perfectly pulseless, and every indication of pulsation in the aorta below it had disappeared.

“*Wednesday, April 20th.*—Patient feels restless and slightly feverish, with thirst and hot skin, but the pulse is only 72 and feeble. Bowels open, passes water freely; can stand, although the legs are still numb, and he feels ‘pins and needles’ in his feet. In consultation with Dr. Heath, a most careful examination was made, and the following observations were confirmed by that gentleman. There is no pulsation in the tumour, which is now perfectly stationary, hard, resistant, and lessened in size. Nor are any pulsations to be felt in the aorta below the tumour, in the iliacs, or in the femoral arteries.

“*Thursday, April 21st.*—Patient looks well and feels much better; says he is more free from pain than he has been for several months. There is a very slight movement in the tumour, which is now a hard globular mass, easily felt, and slightly movable. but evidently smaller than before. At one or two points on the abdominal wall pulsating vessels can be felt, but there is no pulsation in the femorals.

"*Friday, 22d.*—With Mr. Lightfoot, who carefully examined the case, the following points were made out and verified by that gentleman: A solid hard tumour, about the size of an apple, lying to the left of the umbilicus, can be felt, and during deep expiration can be seen. It is motionless to the eye, and by the hand the slightest possible forward movement can be distinguished at its upper border, as if communicated from the aorta pulsating above. No expansion, thrill, or bruit, can be made out. Running over the right border of the tumour a vessel can be felt pulsating, which, from its position and size, is probably the superior mesenteric artery. The femorals are pulseless. All numbness is gone from the legs, and the patient declares he feels quite well.

"*Saturday, 23d.*—Observation of the tumour corresponds with the notes of yesterday in every particular. The pulsation of small arteries in the abdominal wall is now pretty distinct. The patient is sitting up and out of bed, feels better than he has done for months past, and is free from pain. Eats well and sleeps well.

"*Sunday, 24th.*—Going on well.

"*Monday, 25th.*—Still improving, and is moving about freely. The tumour is now much diminished in size, and no pulsation can be distinguished. (Observation confirmed by Dr. Spencer.)

"*Tuesday, 26th.*—The patient has been out this morning, and walked about a quarter of a mile. On ceasing to walk he felt as if a cord was tied around his waist, and was quite numb below that level. He feels his legs numb and weak, but in other respects is quite well and in good spirits, declaring himself to be better than he has been 'for eleven months past.' After careful examinations, the observations previously made were this morning confirmed by Messrs. Fife and Armstrong. Mr. Rayne, after a very careful examination, also expressed his conviction 'that there is now no blood passing through the tumour.' Dr. Gibb and many other medical gentlemen in the town, after examining the parts, came to a similar conclusion.

"*May 1st.*—Patient still improving. Legs warm and stronger, but still numb when he walks far. Had an attack of diarrhoea, which ceased on taking a few doses of chalk mixture. No pulsation in the tumour or arteries below it.

"*5th.*—Still improving. Took a long walk two days ago, and, except a feeling of numbness and weakness in the legs, was no worse for it. Tumour carefully examined this morning in the presence of several medical men, when the following points were observed and verified: 'The tumour is stationary, harder than before, and lessened in size. Its periphery lies seven inches from the sternum (the patient having a long chest) and five inches above the pubes, four inches from the anterior superior spine of ilium on the left side, and five inches from the same point on the right side. It lies a little more to the left than to the right of the umbilicus.' No bruit can be heard, and the aorta above can be felt beating in the epigastrium.

"*11th.*—Patient still improving, tumour pulseless, and diminishing in size."

A postscript, dated September 26, 1864, states that the man is working as an engine-fitter from 6 A.M. till 8, and sometimes 10 P.M., in addition to which he has to walk nearly two miles to and from his work. Five months had elapsed since pulsation was felt in the tumour. There was distinct pulsation in the right femoral artery, but no certain evidence of it in the left.

Full abstracts of the paper of Mr. Moore, with the case related by Dr. Murchison, and of that of Dr. Habershon, are published in the numbers of this Journal for July and April, 1864. Dr. Habershon, in his observations upon the effects produced by the implication of branches of the pneumogastric nerve in aneurismal tumours, says that he has never witnessed marked gastric symptoms from aneurismal disease of the thoracic aorta (page 51). We had under our care from November, 1863, to April, 1865, a gentleman, aged 45, by occupation a shipping-merchant, with the most distressing and obstinate symptoms of dyspepsia we ever witnessed, except

in organic disease of the stomach. He said he had been dyspeptic for twelve years at least. The most remarkable phenomenon was the constant eructation of gas, which often prevented sleep for many nights in succession. This gentleman frequently passed the whole night standing and leaning against a wall, and now and then "losing himself" from complete exhaustion. He thought that in this position the gas came up more readily. All the remedies we tried, and they were numerous, failed to give relief. As some interference with the pneumogastric nerve was supposed to be, possibly, at the bottom of all the trouble, an examination was made on several occasions of the condition of the aorta, but nothing abnormal was detected. The last time was only a few weeks anterior to his death, after the perusal of the work of Tufnell, noticed in the April number of the Journal. About twelve months before his death he effected an insurance upon his life for five thousand dollars, when, of course, the examining physician to the company must have failed to detect anything abnormal in the aorta. For some three or four months previous to his death, dyspnoea manifested itself as a prominent symptom. He died suddenly in the night, blood gushing from his mouth, and on examination we found dilatation of the cross of the aorta, which had become so thin where it is alongside of the left bronchus, as to have burst into it. There was no blood in the cavity of the chest. *There was no disease found in the stomach*; all the symptoms of dyspepsia must have been caused by the implication of the left pneumogastric nerve in the aneurismal tumour. We have related this case, as the experience of Dr. Habershon, recorded in this paper, might increase the difficulty of making the diagnosis in these exceedingly difficult cases of internal aneurism.

IX. *On the endemic hæmaturia of the Cape of Good Hope.* By JOHN HARLEY, M. D. (Communicated by Dr. Lionel S. Beale.)

An abstract of this interesting paper, together with the very important remarks made by Dr. Cobbold on the occasion of its reading before the Society, is published in the number of this Journal for April, 1864. Two plates accompany the paper representing the parasite in various stages of development.

X. *Some account of the amputations performed at St. Bartholomew's Hospital, from the 1st January, 1853, to the 1st October, 1863.* By GEORGE WILLIAM CALLENDER.

An abstract of this communication is published in the April number of this Journal for 1864.

XI. *A case of strangulated femoral rupture, where, on a former occasion, the neck had been torn from the body of the sac, in the taxis, and the escaping bowel had formed a subperitoneal pouch, which finally attained an extraordinary size.* By J. W. HULKE.

In the XLII. volume of the Transactions is a paper by JOHN BIRKETT, of which an abstract is given in the number of this Journal for April, 1860, upon certain cases of hernia, some of which resemble greatly the one here related. The anatomical condition of the parts, as found at the *post-mortem* examination in Mr. Hulke's case, is represented by two wood-cuts.

XII. *On the absorption of dead bone.* By WILLIAM SCOVELL SAVORY.

A short abstract of this paper, together with a report of the remarks made in the Society on the occasion of its reading, is published in the number of this Journal for July, 1864.

Mr. Savory's experiments prove that pegs, made out of the compact substance of the shaft of the human femur, when driven *tightly* into the bone of an animal, and left there for some weeks, are found to have dimin-

ished in their weight, and in some, at least, of the experiments described, the portion that disappeared could not have escaped externally.

XIII. *On a new operation for obtaining union of ununited fracture, with remarks on its application to certain cases of recent fracture.* By E. R. BICKERSTETT, Esq. (Communicated by Dr. Murchison.)

An abstract of this paper, together with the remarks made by Fergusson, Coote, and Barwell, on the occasion of its communication to the Society, is published in the number of this Journal for July, 1864. It is one of the most important papers in the volume, and the method indicated therein for fixing, in a desirable position, fragments of broken bone will, we doubt not, be extensively adopted. The bone-drill, described in the preceding number of this Journal (April, 1865) by Dr. B. Howard, would afford great assistance in practising the operation. This communication is illustrated by three wood-cuts and two lithographic plates.

XV. *Two cases of stone in the bladder of the female treated by rapid urethral dilatation, with remarks on the operation.* By THOMAS BRYANT.

An abstract of this interesting paper, together with some very valuable observations made after its reading before the Society by Mr. Henry Thompson, is published in the number of this Journal for July, 1864.

XVI. *Statistics of Queen Charlotte's Lying-in Hospital.* By GEORGE B. BRODIE, M. D. (Communicated by Charles Hawkins.)

A full abstract of this paper, together with the remarks made at the time of its communication to the Society by Drs. Webster and Mackenzie, is published in the number of this Journal for July, 1864.

XVIII. *Case of congenital imperfection of the mammæ, sexual organs, sternum, and heart, in a woman aged twenty-two years.* By EDWARD HEADLAM GREENHOW, M. D.

This communication gives an account of an unmarried woman, a servant, 22 years of age, who, when examined, was found to have a considerable depression of the sternum, no discoverable trace of mammary glands, an irregular action of the heart, and a condition of the genital organs which is thus described :—

“Mons veneris very slightly prominent, has very scanty covering of hair; skin very fair on these parts. Clitoris and nymphæ present and of normal size. Hymen and vestibule very vascular; the opening through it admits with difficulty the index finger. Vagina very narrow, admits two and three-quarter inches of index finger. No os uteri found projecting into vagina, although there is one spot the size of top of index finger which feels thickened. On pressing firmly against the vaginal cul-de-sac no cervix of the uterus, nor anything like ovaries or other solid matter, can be felt beyond it. No orifice can be detected by the touch at the thickened point. No examination by speculum was made, as the vagina was much too narrow for such a mode of inquiry. On examination per rectum there appears to be a uterus, that is to say, a solid body is felt on pressing against the anterior wall of the rectum, but this body is smaller and much less distinct than an ordinary uterus, and nothing resembling ovaries could be discovered.”

Dr. Greenhow has been able to find only four cases on record in any respect similar to this one.

The main points of interest in this case are to be determined only by examination of the body, after the death of the woman.

A wood-cut, in this communication, represents the anterior face of the thorax, to show the absence of mammary glands.

XIX. *Pathological researches into the diseases of the ear.* (Supple-

ment to the seventh series.) *Sebaceous tumours in the external auditory meatus.* By JOSEPH TOYNBEE.

In the forty-fourth volume of the *Transactions*, reviewed in the number of this Journal for April, 1862, is a paper by Mr. Toynbee, giving an account of a number of cases of sebaceous tumours developed in the external auditory apparatus. In several of them caries of the petrous bone had occurred; in one, abscess in the cerebrum, and in another abscess of the cerebellum had taken place.

In the present communication two cases are related where a sebaceous tumour had caused caries of the petrous bone, terminating fatally, from the effects of inflammation caused within the cranium. The subject is one very little known, and, at the same time, of great importance. The peculiarly insidious manner in which sebaceous tumours make progress, often, indeed, scarcely betraying their existence until the appearance of severe, frequently fatal, cerebral symptoms, demands careful consideration, and should lead to a thorough examination of the ear when the slightest symptoms of irritation in the meatus are complained of.

XX. *On the condition of the stomach and intestines in scarlatina.* By SAMUEL FENWICK, M. D.

A full abstract of this important paper together with observations made by Dr. Wilson Fox, at the time of its reading before the Society, is published in the number of this Journal for October, 1864.

This communication is illustrated by three handsome lithographic plates, one of which is coloured.

XXI. *On the origin, structure, and mode of development of the cystic tumours of the ovary.* By WILSON FOX, M. D.

A very concise abstract of this very interesting paper is published in the number of this Journal for October, 1864. The paper is one of very considerable length, occupying over sixty pages of this volume, and is by far the most important contribution yet made to the pathology of a class of affections, to the treatment of which so much attention has been paid of recent years.

This communication is illustrated by three large lithographic plates containing forty-two figures.

XXII. *A successful case of paracentesis capitis.* By THOMAS YOUNG THOMPSON. (Communicated by Dr. Fuller.)

The patient in this case was a male child, born of healthy parents, without any tubercular history. When fourteen days old, he sustained a fall, apparently without any ill effects, but at the end of three weeks a protuberance appeared on the crown of the head, at first circumscribed, but gradually becoming diffused. The head then began slowly to enlarge, and continued to do so, notwithstanding local and general treatment, followed for ten months. The head then measured, circularly, twenty-four and a half inches, and laterally twenty-four and a quarter; it increased at the rate of an inch in two weeks.

About ten ounces of a colourless liquid were withdrawn, through an opening made by a trocar, of crow-quill size, passed through the coronal suture, an inch and a half from the anterior fontanelle. The head was then firmly encircled in broad strips of adhesive plaster. The fluid continued to flow for some twenty-four hours, and a few ounces thus escaped.

On the seventh day fresh strips of plaster were applied. Convulsive symptoms, lasting for two hours, occurred on the tenth day.

Forty days after this operation the head appeared to be nearly as large

as before. Four ounces of fluid, this time milky and of the consistency of weak gum-water, were withdrawn, in the same way as just related. The head remained much in the same condition, and seven weeks after this second operation measured circularly twenty-two, and laterally twenty-three inches. Sea-bathing, cod-liver oil, and preparations of iron were employed.

At the age of three years the child was strong, well-nourished, and very intelligent. The whole surface of the head was firm, no soft parts could be felt: it measured circularly twenty-three and a half inches, and laterally twenty-three.

It appears to us very doubtful, indeed, whether the happy result in this case was the effect of the tapping of the head.

XXIII. *On the causes of hernia.* By JOHN A. KINGDON.

A short abstract of this paper by Mr. Kingdon, who is Surgeon to the London Truss Society, is published in the number of the Journal for October, 1864. Mr. Kingdon endeavours to show: That in the normal and healthy condition of the peritoneum, the viscera in the abdomen do not come within the grasp of the power by which they are pushed outside of the cavity; and, therefore, that although the proximate cause of hernia is mechanical, the predisposing, real cause is pathological.

This communication has a certain interest, but we cannot consider that it has much practical value. The causes of hernia, so far as we can act upon the affection, are mechanical, and the contents of the abdomen come out, when pressed upon, and an opening presents itself, as Garengéot long ago expressed it, "in the same manner as dough squeezed in the hand comes out through the intervals of the fingers."

XXIV. *Report of the committee appointed by the Royal Medical and Chirurgical Society to inquire into the uses and the physiological, therapeutical, and toxical effects of chloroform, as well as into the best mode of administering it, and of obviating any ill consequences resulting from its administration.*

An abstract of this report is published in the number of this Journal for October, 1864.

The tables in the original communication are particularly worthy of study. The one marked "TABLE A. *Fatal effects of chloroform,*" contains the record of 109 cases, where death was caused by the administration of this potent agent.

There is one evil attending the administration of anæsthetics, to which we have not yet seen any attention called; this is, that operations are more apt to be performed carelessly, and by incompetent persons, than when the patient is fully alive to what is being practised upon him.

W. F. A.

BIBLIOGRAPHICAL NOTICES.

ART. XXIII.—*Military Sanitary Matters, and Statistics.*

1. *La Commission Sanitaire des Etats-Unis, son Origine, son Organization et ses Résultats, avec une Notice sur les Hôpitaux Militaires aux Etats-Unis et sur la Réforme Sanitaire dans les Armées Européennes.* Par THOMAS W. EVANS, Docteur en Médecine, etc. etc. 8vo. pp. 178. Paris, 1865.
2. *Annual Report of the Surgeon-General for the year 1864, made to the Governor of the State of Ohio.* 8vo. pp. 87. Columbus, Ohio, 1863.
3. *Annual Report of the Provost Marshal-General.* November 15, 1864. 8vo. pp. 49. With Five Large Tables.
4. *Report to the Western Sanitary Commission on the General Military Hospitals of St. Louis, Mo.* Presented August 1, 1862. 8vo. pp. 76. St. Louis, 1862.
5. *Report of the General Superintendent of the Philadelphia Branch of the U. S. Sanitary Commission to the Executive Committee,* January 1, 1865. 8vo. pp. 51.

THE organization of the Sanitary Commission of the United States has marked a new era in the history of the world. It is an effort of philanthropy the grandest which man has ever conceived and fully carried out. Independently of the incalculable good which it has accomplished in lessening the privations, assuaging the sufferings, and preserving the strength and lives of the soldiers, and thus promoting in the highest degree the efficiency of our armies in the field, society throughout all the loyal portion of the United States has, by its influence, been strangely modified. We refer not to the spirit of liberality which it has evoked, and which has caused an extraordinary amount of funds to be placed at the disposal of the Commission; but by its having caused the movements that were initiated by it to better the health and comfort, the physical condition generally of our soldiers, to become the leading thought of the masses, to the exclusion almost of every other, and in enlisting all classes of our citizens, directly or indirectly, in the accomplishment of its vast mission of beneficence.

Of this change Dr. Evans remarks, that he found the most convincing evidence during a voyage he made to this country for the especial object of studying the hygienic condition of the American armies, and the organization and operations of the Sanitary Commission.

"Many years having elapsed," he remarks, "since my residence in the United States, I could not but be deeply impressed by the marvellous change which I recognized in the sentiments and movements generally of society. The tastes and occupations of my former friends and acquaintances had become strangely modified. The very men who formerly were completely engrossed by the cares of business, found now abundant leisure to consecrate to the duties of a generous patriotism and noble philanthropy. The women I found no longer taken up with an interminable round of frivolous visits or fashionable parties, but more or less busily engaged in preparing for the Commission a multitude of objects to be applied by it for increasing the comfort of the soldier, when they are not to be found in the military hospitals seated, as ministering and soothing spirits, by the couch of the sick and wounded."

The beneficial influence of the United States Sanitary Commission has not been confined to our own soldiers. The doings of the Commission have attracted public attention throughout Europe, and have caused similar organizations to

be formed by more than one of the Continental governments. During the late Danio-Germanic conflict, committees of succor, organized after the exact model of our own aid associations, rendered the greatest service to both armies. The Queen of Prussia, likewise, has added to her crown a new and brilliant jewel in securing the love and gratitude of the wounded soldiers by her visits to the hospitals of Slesvig and Holstein, and by her declaration when she caused supplies to be distributed to the victims of the two conflicting armies. "In the present crisis, I neither speak nor feel as a queen, I simply express my sympathy as a female for suffering humanity."

Dr. Evans presents a brief sketch of the effort which has been made in Europe to give to the plans of relief initiated by our Sanitary Commissions a practical form. The first movement to this effect took place in Geneva, and the honour of giving to the work the primary impulse is due to J. Henry Dunant, whose name has been rendered familiar to the European public, by his generous efforts for the creation, during the Italian Campaign, of a voluntary corps of hospital attendants and overseers, and by his modest but interesting work "*Un Souvenir de Solférino*."

On the first day of September, 1863, the Society of Public Utility of Geneva, addressed a circular to different governments, to many well-known philanthropists, and to the principal military officers of the armies of Europe, inviting their co-operation and presence at an international conference to be held at Geneva. The object of the proposed conference was "to consider the means to be employed to remedy the insufficiency of the sanitary service in armies in the field." The project was warmly received. On the 26th of October, 1863, there assembled at Geneva delegates from Russia, Austria, Prussia, and the principal Estates of Germany; from France, England, Spain, Holland, Sweden, and Switzerland. A plan of organization was definitely agreed upon, and a series of important resolutions adopted; terminated with the recommendation: "That during war entire neutrality shall be observed by the belligerent nations in respect to ambulances, their occupants, drivers, and attendants, and in respect to all hospitals, their inmates, medical officers, nurses, and servants, and also to the visitors to such hospitals, whose sole object is to administer to the wants and assuage the sufferings of the sick and wounded."

The action of the conference received the approval and encouragement of many of the European governments. The Emperor of Russia, the King of Saxony, the Grand Duke of Baden, the Royal family of Wurtemberg, Don Sebastian of Bourbon and Braganza, the Kings of Denmark and of Prussia, and the Emperor of France, have all manifested their interest in the matter, and given material aid to the fulfilment of the benevolent designs of the conference.

On the 8th of August, 1864, a second meeting was held at Geneva, and, at the same time, there was also convened there an international congress, the members of which were invested with full power to treat officially the grave questions arising out of the proposed sanitary reform in armies actually engaged in carrying on war, suggested to them by the Swiss conference. A treaty was finally concluded, and ratified by the official representatives of fifteen European governments. The provisions of this treaty cannot fail to give a new aspect, in one direction at least, to military law, and to diminish in a great degree the sufferings, if not the horrors of the field of battle.

While everything which relates to the management of the sick and wounded soldier with the view to the diminution of his sufferings, the preservation of his life and limbs, and his speedy restoration to a normal condition of health and vigour is all important, whether considered in a military, economical, or benevolent point of view, not less so are the questions which have reference to the means best adapted to preserve his physical efficiency to endure the labours and fatigues of military life, and perform the duties that may be required of him in camp, in fortification, or on the field. Primary among these questions is that of diet. The great requisites in a soldier's diet when in actual service, are smallness in bulk, unliability to speedy deterioration, agreeableness to the palate, the possession of sufficient nourishment, and absence of any tendency to bring on disease.

2. In the report of the Surgeon-General of Ohio, we have presented to us a very elaborate and instructive essay by Dr. J. H. Salisbury, on "Chronic Diarrhœa and its Complications," in which are contained some most interesting observations on diet as a cause of these abnormal conditions, and in their treatment, with the suggestion of a new army ration as a preventive of camp diarrhœa and its concomitant diseases.

Dr. Salisbury remarks that the diseases arising in the soldier from too exclusive a confinement to a diet composed of any one kind of food are far more numerous than has been heretofore supposed. It has been long known that the too exclusive use of salted meat tends to the production of a scorbutic condition. More recently it has been shown that fresh meats also, under similar circumstances, produce the same morbid state. The scorbutic diathesis thus established is best counteracted by a free use of vegetable food and the vegetable-acid salts of potassa and iron. To the list of scorbutic producers Dr. Salisbury now adds, the too large and exclusive consumption of *vegetable* food, especially that of an *amylaceous* and *leguminous* nature. This he pronounces to be in an eminent degree a scorbutic excitant. The morbid conditions to which it gives rise are, however, it is remarked of a peculiar type, differing in many particulars from those produced by animal food, salted or fresh. When the scorbutic taint results from the too exclusive use of amylaceous and leguminous food, it is best treated, not alone by the free use of vegetables and the vegetable-acid salts of potassa and iron, but requires in conjunction with the latter *albuminous animal food*.

The abnormal states produced by too exclusive a use of flesh are chiefly shown in the mouth and skin. The blood becomes thin, with little or no tendency to the formation of fibrinous deposits; whereas the scorbutic taint resulting from a diet too exclusively amylaceous, exhibits itself first in a deranged condition of the alimentary canal and nervous system, with a remarkable tendency to fibrinous depositions in the heart and lungs. Both forms of scorbutus are often attended in their course by pains and soreness of the extremities and back, simulating the sufferings from chronic muscular rheumatism.

According to the experience of Dr. Salisbury, the chief of the diseases peculiar to the army, and which have not been found amenable in any extent to the same treatment which has been found the most successful in apparently similar diseases occurring in civil practice, are referable to certain abnormal states induced by insufficient and imperfect alimentation and fermentative conditions, with a peculiar scorbutic taint developed by a diet too exclusively amylaceous. In this group of diseases incident to the army may be placed, *chronic diarrhœa; paralytic conditions, fibrinous depositions in the heart and pulmonary vessels, tendency to tuberculosis, loss of voice, so-called muscular rheumatism, and various affections of the eye and ear.*

It would be by no means unprofitable to follow the author in his exposition of the facts and observations upon which he predicates his peculiar views in respect to the effects upon health of a too exclusive diet of amylaceous food, and the class of diseases thereby induced, we must content ourselves, however, with the presentation only of Dr. Salisbury's general conclusions in his own words.

"1. Vegetable food, and especially that of an amylaceous and leguminous character, when too exclusively and continuously used, produces fermentative and scorbutic conditions.

"2. These conditions show themselves in the following abnormal states, viz., the formation of fibrinous masses (*embolia*) in the capillary vessels of sensitive, irritated, and irritable parts, resulting in congestions, inflammations, diarrhœa, paralytic tendencies, loss of voice, and diseases of the eye and ear, with pains and aches in the extremities and back, and also a disposition to morbid cell development, from which result tubercular depositions in the lungs.

"3. The abnormal conditions excited by an amylaceous and leguminous diet require as dietetic and remedial means, albuminous animal food, instead of vegetables, with antifermentives for controlling zymotic action; in conjunction with which are indicated the vegetable salts of potassa and iron, for promoting the solution of the fibrinous clots and thinning the blood, and encouraging intestinal epithelial activity, absorption, and secretion.

"4. These conditions are developed mostly during and immediately following campaigns, where the men are confined too exclusively to an amylaceous diet.

"5. The officers who carry with them variety of food, with the means for cooking it, are exempt from this class of diseases.

"6. The first manifestation of abnormal tendencies, after beginning to feed too exclusively upon amylaceous or saccharine food, or on any of the products of its fermentation, is constipation.

"7. This constipation is soon followed by fermentative changes, and the development of intestinal gases and yeast plants in the food too long delayed in the alimentary canal.

"8. As soon as gases begin to develop in the intestinal canal, yeast plants begin to form in the alimentary matters to an abnormal extent.

"9. This development of yeast plants is evidence of the inauguration of fermentative changes in the amylaceous food.

"10. Such fermentation and development of yeast plants continue to increase till a diarrhetic condition is produced.

"11. A peculiar gelatinous, algoid, matter—usually in little masses scattered through the feces—shows itself, to a greater or less extent, as soon as the diarrhœa commences. Generally this algoid (colloid) matter is present in direct proportion to the severity of the disease.

"12. This algoid development is not the cause of the diarrhœa, but merely the consequence of certain saccharine and fermentative conditions of the system, in which state the alimentary canal becomes a proper nidus for its development. As soon as these systemic conditions are overcome, this algoid vegetation ceases to develop, and disappears entirely from the feces. It hence may be regarded as merely the consequence, and not the cause, of certain systemic conditions. Its development appears, however, to act as a poison, and increases the intestinal lesions.

"13. The system on an amylaceous diet becomes highly saccharine and fermentative, so that even the mucous secretions often contain sugar, and pass rapidly into fermentative states, developing yeast plants.

"14. This saccharine condition is abnormal, and appears to be a peculiar type of the so-called *scorbutic taint*, and yields more readily to an albuminous diet, with anti-fermentives and the vegetable acid salts of potassa and iron, with iodine in small, frequent, and unirritating doses, than to any other dietetic and remedial means.

"15. The fermentative changes in the alimentary canal are always more active towards evening and during the night, and go on increasing from day to day.

"16. Finally, the gases and yeast plants developed, produce so much intestinal irritation that diarrhœa ensues, which soon becomes chronic and not at all amenable to the treatment for ordinary diarrhetic conditions.

"17. Accompanying the fermentative changes is always a paralytic tendency, more or less strongly marked. This is manifest in the alimentary canal, and especially in the large intestines—next in the extremities—the legs prickling and getting asleep frequently, with ringing in the ears, and a numb, mixed up, confused feeling in the head, etc.

"18. This paralytic tendency appears to arise from defective nutrition and the pressure produced by the clogging up of the capillary vessels with fibrinous masses, from which results serious congestions, &c., as in the intestinal walls, nerve centres, lungs, etc.

"19. A cough, with more or less hoarseness, usually sets in, especially during the night and on getting up in the morning, accompanied by the expectoration of a thick, sweetish, cream-coloured mucus.

"20. This is followed by more or less constriction in breathing, with frequently palpitation of the heart on any excitement.

"21. In this condition of the system there is usually a remarkable tendency to fibrinous depositions in the heart (*thrombosis*), and to the clogging up of the pulmonary vessels with fibrinous masses (*embolia*), with tubercular tendencies, and pains and aches in the extremities and back, simulating muscular rheumatism.

"22. The disease, so fatal in animals, known as 'hog cholera,' is the same ab-

normal state of the system as the chronic diarrhœa of armies, both arising from the same cause, viz., the too exclusive feeding upon amylaceous or saccharine food, or upon the products of their fermentation.

"23. The primary lesion appears to be the clotting of the blood or the aggregation of fibrinous masses in the capillary vessels and heart.

"24. There is a strong probability that the conditions of the system, which result in diabetes, are similar to those producing chronic diarrhœa. There is also evidence, that the conditions of the system which result in bronchocele, are similar to those which give rise to chronic diarrhœa; the former disease occurring in persons habitually subsisting from infancy on a diet too exclusively vegetable and amylaceous, while the latter has its origin in the too exclusive use of the same kind of food at any period of life, by those whose system has been previously accustomed to a mixed animal and vegetable diet.

"25. There is strong evidence, also, that the condition of the system which gives rise to summer complaints and fluxes in children, especially those in which the stools are gelatinous (*colloid*), and green (*the so-called colloid matter*) is similar to that which results in chronic diarrhœa. It appears to be caused by the too exclusive and continued use of starch and saccharine substances and fruits, in which children are largely indulged.

"26. The colloid matter of chronic diarrhœa appears to be algoid, belonging to some of the lowest vegetable forms.

"27. This algoid matter is not the cause of chronic diarrhœa, but merely the consequence of certain glycogenic conditions of the system, brought on by feeding too exclusively upon amylaceous food. After it begins to develop in the alimentary canal, it tends to exhaust the system and aggravate the lesions and the disease.

"28. Sugar, vinegar, carbonic acid, and even alcoholic beverages, when too exclusively and continuously used, tend to produce a similar condition of the system with that from amylaceous food.

"29. Thus amylaceous and saccharine matters, with the products of their fermentation, when too exclusively and continuously used as food, or otherwise introduced into the system, give rise to similar lesions, and abnormal conditions, and tend to produce in the heart and capillary vessels, fibrinous depositions, which give rise to thrombosis, congestion, and hepatization of lungs, congestion, and inflammation of the intestinal walls, with damming up of the blood in the capillaries that nourish the nerve-centres and extremities, resulting in paralytic tendencies, with sometimes loss of voice and diseases of eye and ear.

"30. The above make up the great mass of the most obstinate, lingering, and fatal diseases of the army, causing a greater amount of mortality, and more suffering among the soldiers, than the casualties of the battle-field, and all other diseases incident to military life combined. Hence, if we would prevent the occurrence of these diseases, a change from the present army diet must be made."

According to Dr. Salisbury, this change is to be effected by substituting for the present army ration, *desiccated beef and vegetables*, which are, besides being sufficiently nutritive, antiscorbutic and antifermentative. They are, also, exceedingly light, and would enable the soldier to carry with him with greater ease provisions for thirty days than he can, with his present rations, provisions for five days. The substitution suggested would incur no additional expenditure. With desiccated food, the heavy and cumbersome commissary trains, that so impede the movements of an army, could also be dispensed with.

At present, as Dr. Salisbury remarks, the bulk and weight of the soldier's food consist, to a very large extent, in the water combined with his rations. This water can almost always be supplied from the springs, brooks, and rivers he meets along his line of march. In desiccated food this enormous weight of water is got rid of, while the meat and vegetables are also greatly reduced in bulk by compression. This form of food has been already submitted to a practical test, as a campaigning diet, during the Arctic expedition of Dr. Hayes, and found to answer fully as a good, nourishing, anti-fermentative and anti-scorbutic diet. In Dr. Kane's expedition this form of food was not used, and the men suffered much from scurvy and chilblains; whereas, in the expedition of Dr.

Hayes, although it penetrated to a point much further north, yet not a solitary case of scurvy nor a single chilblain occurred among the men.

Beans and peas have a decided tendency to produce indigestion, flatulence, intestinal irritation, with its intercurrent derangements. Dr. Salisbury suggests, therefore, their entire abandonment as army food.

3. In the report of the Provost-Marshal General are contained a series of most interesting statistical tables. Several of these have a value far beyond the subject of enlistments, invaliding and the mortality among soldiers in the field. They present facts which illustrate to some extent the sanitary condition of communities in time of peace and engaged in civil pursuits.

The first of the tables of general import, to which we have reference, is one showing the ratio of exemptions from military service for mental and physical infirmities, in the United States, France, Great Britain, and Belgium.

In the United States, the ratio rejected per 1000 men examined was, in 1863 and 1864, 257.02. In France, 1831 to 1833 and 1859, 317. In Great Britain, 1832 to 1851, and 1860 to 1862, 317.3. In Belgium, 1851 to 1855, 320.6.

The following table exhibits the diseases as given in the several sections of the revised regulations for causes of exemption, the whole number exempted under each section in all the States, with the ratio of exemptions per 1000 of those examined in the second draft of March, 1864. Whole number examined, 61,257.

Number of section.	Physical and mental disqualifications.	Number exempted.	Ratio per 1000.
1.	Manifest mental imbecility	181	2.95
2.	Insanity	108	1.76
3.	Epilepsy	388	6.33
4.	Paralysis, general and partial, chorea, atrophy of limbs	262	4.28
5.	Organic disease of internal organs	1512	24.68
6.	Developed tuberculosis	830	13.55
7.	Cancer, aneurism of large arteries	28	.46
8.	Inveterate and extensive disease of skin	106	1.73
9.	Permanent physical disability	1696	27.69
10.	Scrofula—secondary syphilis	265	4.33
11.	Chronic rheumatism	279	4.55
12.	Total loss of sight, cataract or loss of crystalline lens of right eye	445	7.26
13.	Partial loss of sight of the eyes—Serious permanent disease of eye or eyelids	410	6.69
14.	Total loss of nose, deformity of nose, ozæna	27	.44
15.	Decided deafness	411	6.38
16.	Disease or deformity of jaw, caries of bones of face, cleft palate	60	.98
17.	Dumbness, permanent loss of voice	11	.17
18.	Loss of tongue, diseases of tongue	5	.08
19.	Stammering	98	1.60
20.	Loss of teeth	1544	25.20
21.	Tumours or wounds of neck, fistula of larynx or trachea, torticollis	29	.47
22.	Deformed chest, curvature of spine, ribs or sternum	327	5.50
23.	Hernia	2115	34.52
24.	Diseases of rectum	152	2.48
25.	Internal hemorrhoids	203	3.31
26.	Loss of penis, epispadia and hypospodia	11	.17
27.	Incurable permanent stricture of urethra	45	.73
28.	Stone in bladder	15	.24
29.	Confirmed or malignant sarcocele, hydrocele complicated	153	2.58
30.	Loss of hand or foot	79	1.29
31.	Wounds, muscular or cutaneous contractions	495	8.41
32.	Fractures, dislocations, or ankylosis of large joints, diseases of joints or bones	1756	28.67
33.	Permanent defects of hands, loss of thumbs and fingers	295	4.82
34.	Club feet, total loss of great toe, other permanent defects or deformities of feet	305	8.24
35.	Varicose veins of inferior extremities	504	8.23
36.	Chronic ulcers	379	6.02
Total		15,734	257.02

The following table is the ratio of rejections for mental and physical infirmities in the United States, France, Great Britain, and Belgium.

In the *United States*, the number examined was, in 1863, 255,188, of which 80,134 were exempted, or, 314.02 per 1000. In the supplementary draft in 1865, 61,257 were examined, and 15,744 exempted, being 257.02 per 1000.

In *France*, from 1831 to 1843, 2,097,876 were examined, and 680,560 exempted, or 324.4 per 1000. In 1859, 200,926 were examined, and 63,820 exempted, or 317 per 1000.

In *Great Britain*, from 1832 to 1851, and 1860 to 1862, 353,806 were examined, and 112,266 exempted, or 317.3 per 1000.

In *Belgium*, from 1851 to 1855, 201,790 were examined, and 64,696 exempted, or 320.6 per 1000.

The following are the exemptions, in every *thousand* of those examined, for certain diseases and infirmities, in the United States during 1863. in Great Britain during the years 1860 and 1861 respectively, in France from 1831 to 1843, and in Belgium from 1851 to 1855:—

For imbecility.—United States, 3.88; Great Britain, 2.20 (in 1860), .50 (in 1861); France, 00; Belgium, 1.69.

Epilepsy.—United States, 8.39; Great Britain, 00–00; France, 1.9; Belgium, .94.

Disease of brain, spinal cord, heart, and lungs.—United States, 45.35; Great Britain, 15.36 (in 1860), 27.27 (in 1861); France, 00; Belgium, 00.

Consumption.—United States, 15.00; Great Britain, 2.26 (in 1860), 5.00 (in 1861); France, 00; Belgium, 00.

Feebleness of constitution, deformed and contracted chest, curvature of spine.—United States, 44.29; Great Britain, 57.03 (in 1860), 97.45 (in 1861); France, 94.8; Belgium, 19.08.

Scrofula and syphilis.—United States, 5.16; Great Britain, 21.13 (in 1860), 28.52 (in 1861); France, 00; Belgium, 10.5.

Disease of skin.—United States, 1.92; Great Britain, 5.54 (in 1860), 8.63 (in 1861); France, 12.51; Belgium, 6.34.

Diseases of eyes, including myopia.—United States, 19.97; Great Britain, 28.75 (in 1860), 28.52 (in 1861); France, 20; Belgium, 13.08.

Disease of ears, and deafness.—United States, 7.13; Great Britain, 3.10 (in 1860), 4.51 (in 1861); France, 00; Belgium, 1.68.

Disease of nose and mouth.—United States, .51; Great Britain, .77 (in 1860), 1.63 (in 1861); France, 00; Belgium, 00.

Stammering.—United States, 1.76; Great Britain, 1.31 (in 1860), 1.63 (in 1861); France, 00; Belgium, 00.

Loss of teeth.—United States, 20.49; Great Britain, 9.52 (in 1860), 7.76 (in 1861); France, 8.5; Belgium, .26.

Hernia.—United States, 30.93; Great Britain, 11.79 (in 1860), 14.89 (in 1861); France, 24.5; Belgium, 3.99.

[The English returns exempt in 1860 6.13, and in 1861 11.76 per 1,000, for *laxity of abdominal rings*, showing tendency to hernia.]

Hæmorrhoids.—United States, 3.59; Great Britain, 5.00 (in 1860), 5.88 (in 1861); France, 00; Belgium, 00.

Varicose veins.—United States, 7.63; Great Britain, 28.63 (in 1860), 40.79 (in 1861); France, 00; Belgium, 00.

Varicocele.—United States, 3.15; Great Britain, 13.39 (in 1860), 23.52 (in 1861); France, 00; Belgium, 00.

The following tables show the average heights and ages of the recruits, substitutes, and drafted men, in certain States, for the year 1864:—

States.	Total examined.	Average height.	Average greatest height.	Average least height.
New Hampshire .	2,213	5 ft. 5.73 in.	6 ft. 2.5 in.	5 ft. 0.41 in.
Vermont .	148	5 " 7.62 "	6 " 0.5 "	5 " 3.5 "
Massachusetts .	10,305	5 " 6.74 "	6 " 2.24 "	4 " 10.7 "
New York .	12,048	5 " 5.5 "	6 " 2.39 "	4 " 11.8 "
New Jersey .	13,113	5 " 6.86 "	6 " 4.5 "	4 " 8.25 "
Pennsylvania .	13,269	5 " 7.08 "	6 " 3.92 "	4 " 10.42 "
Delaware .	603	5 " 5 "	6 " 3 "	5 " 3 "
Maryland .	6,203	5 " 5.93 "	6 " 2.75 "	4 " 9.75 "
Minnesota .	3,806	5 " 5.56 "	6 " 2.75 "	4 " 7.5 "
Kentucky .	849	5 " 7.02 "	6 " 4.87 "	5 " 5 "
Ohio .	7,688	5 " 6.64 "	6 " 3.38 "	4 " 9.61 "
Michigan .	500	5 " 8 "	6 " 4 "	4 " 3.5 "
	<hr/> 70,745	<hr/> 5 " 6.44 "	<hr/> 6 " 3.07 "	<hr/> 4 " 11.41 "

AGE.

States.	Total examined.	Average age of all examined.
New Hampshire .	2,213	28.93 years.
Vermont .	148	30.26 "
Massachusetts .	10,316	31.27 "
New York .	10,997	29.17 "
New Jersey .	13,113	33.36 "
Pennsylvania .	17,190	28.89 "
Delaware .	1,858	28 "
Maryland .	4,645	31.07 "
Minnesota .	3,806	34.07 "
Kentucky .	1,572	34 "
Ohio .	8,179	28.96 "
Michigan .	500	36 "
	<hr/> 74,537	<hr/> 30.59 "

The report of the Provost Marshal General contains many more medical statistics of very great interest prepared, as were those already noticed, by Surgeon J. H. Baxter; we shall be obliged, however, to content ourselves with the citation of the following facts in reference to the Veteran Reserve Corps, for the year 1863.

The chief disability of the officers who have been appointed or transferred to the Veteran Reserve Corps arose from gunshot wounds. Sixty-six per cent. were sufferers from this cause, in many cases the wounds being of a very serious character.

The principal disabilities among the enlisted men transferred to the Veteran Reserve Corps were gunshot wounds, chronic diarrhœa, injuries, disease of heart, rheumatism, hernia. These disabilities are here arranged in the order of their frequency. The ratio per thousand of gunshot wounds greatly exceeded that of any other disability for which the men had been transferred to the corps. It was 242.35, being nearly every fourth man. The large number of cases of disability referred simply to injuries are not included in making up this ratio. These cases, however, should be included probably among gunshot wounds. Including them, it would give a ratio of 326.72 per thousand, or nearly every third man of the Veteran Reserve Corps.

When we find that the great majority of disabled soldiers discharged from service are dismissed on account of disease, it becomes a matter of surprise that the ratio of gunshot wounds is so much in excess of other disabilities.

The prevalence of diarrhœa, in its several stages, in the army of the United States, during the year ending June 30, 1862, was 653.47 cases in every thousand men; it is not, therefore, surprising that the ratio of this disease, in its chronic form, among the disabilities of the Veteran Reserve Corps, should amount to 91.56 per thousand.

Disease of the heart occurs in the ratio of 69.30 per thousand, or one in 14.4. This complaint has been among the most prolific causes for the discharge of men from the service. For the first two months of 1863 the ratio per thousand, discharged for disease of the heart, was 137. By transference to lighter and less exposed duties in the Veteran Reserve Corps, it undergoes a decided modification in severity, and the soldier affected with it is able to perform all duties pertaining to his position.

Chronic rheumatism is very prevalent among our troops, and it would of course be expected that it would maintain its relative ratio among the disabilities causing a transference to the Veteran Reserve Corps; 54.44 per thousand, or less than one in every 18, is found to exist.

A large number of discharges from the service, previously to the formation of the Veteran Reserve Corps, had been of soldiers, otherwise healthy, for hernia. The ratio among the causes for which men have been transferred to the corps amounts to 40.62 per thousand, or one in every 24.6.

It has been found in many cases where soldiers have been transferred to the Veteran Reserve Corps, that by light duties and comfortable quarters they become after a time again fit for active service, when they are returned to their former position in the army.

Previously to the organization of the Veteran Reserve Corps, all the disabilities in the soldier which admit of his transfer to it would have required, under the then existing regulations, his discharge from the service. It is gratifying to know that, by the aid of the reserve corps, the faithful soldier, disabled from the more active duties of the service, can still find employment, and, instead of becoming mere pensioners upon the government, are able to perform acceptably duties which would otherwise have detained able-bodied men from their proper place in the field.

Much of interest, as well as instruction, may be gleaned from the remaining reports whose titles are prefixed to the present notice. Their contents are, in general, however, of a more local and temporary character than those we have especially noticed.

From the report on the General and Military Hospitals of St. Louis, Mo., we learn that during the ten months ending July, 1862, there were admitted into these hospitals 23,198 patients, of whom 1,826, or $7\frac{7}{8}$ per cent., died. Of the admissions, 20,005 were for sickness incident to climate, exposure, and camp life, and 3,198, or $13\frac{3}{4}$ per cent., as the result of wounds and other casualties. Of the cases of sickness, 1,593 died, or $7\frac{1}{2}$ per cent. Of the wounds and casualties, 228 died, or $7\frac{1}{2}$ per cent.

The casualties were, burns, 10 cases, no death; *concussion of brain*, 3 cases, no death; *contusion*, 157 cases, no death; *fracture*, 95 cases, 3 deaths; *frost-bite*, 13 cases, no death; *hernia*, 206 cases, no death; *luxation*, 16 cases, no death; *sprains*, 26 cases, no death; *contused and lacerated wounds*, 44 cases, no death; *incised wounds*, 25 cases, no death; *punctured wounds (stabs)*, 8 cases, 1 death; *gunshot wounds*, 2,537 cases, 218 deaths; *other injuries*, 52 cases, 11 deaths.

Hospital gangrene was not at all, and *pyæmia* rarely met with. Few suffered from *erysipelas*, and of these few the most recovered. *Tetanus* occurred in only a single case. Only 302 cases of venereal disease were encountered among the 23,198 cases.

From the same report, we derive the following common sense remarks, which we give in very nearly the author's own words. They are worthy of serious consideration on the part of all who may have charge of a military hospital.

One of the most serious difficulties our hospitals, and I presume all the hospitals in the United States, labour under, is the too frequent change of officers and employees. A familiarity with the duties to be performed facilitates dispatch, but in our hospitals, ere the officers and attendants become fully initiated into their duties they are removed to another field of action, and their places too often supplied with novices. Would it not result in more good, if persons were retained in positions for which they are found in all respects qualified during good behaviour? A surgeon in charge of an hospital or ward requires

much time to learn his routine of duties and the best means for their fulfilment, and to study properly the cases under his care; when, therefore, he is suddenly removed to another hospital, it can only be to the detriment of the patients and of the service. The same holds good in respect to nurses, cooks, and all other employees.

The system of taking convalescent soldiers for nurses or cooks, is of questionable utility. Nursing the sick is a very laborious work; only the physically and morally healthy ought to undertake it. How can an untutored soldier, just recovering from wasting disease, do justice to it? The valetudinarian needs repose at night, and active exercise in the open air during the day, but as a nurse, he has to watch during both day and night in the ward. The convalescing soldier is thus prevented from recuperating fully, and returning speedily to the field. Cooking is an art; a good cook is invaluable in camp, much more so in an hospital. Food well prepared would have saved us many a brave soldier, who, for want of it, sickened and died. Would it not be better economy, and more humane, to hire well-trained competent nurses and cooks, to keep them as long as they did their duty well and faithfully? The sick and wounded soldier would be grateful, while the convalescent would be glad to be relieved from a task for which he has neither the capacity, aptitude, nor inclination.

D. F. C.

ART. XXIV.—*The Dispensatory of the United States of America.* By GEORGE B. WOOD, M.D., President of the American Philosophical Society, President of the College of Physicians of Philadelphia, Emeritus Professor of the Theory and Practice of Medicine in the University of Pennsylvania, &c., and FRANKLIN BACHE, M.D., late Professor of Chemistry in Jefferson Medical College of Philadelphia, late Vice-President of the College of Physicians of Philadelphia, late President of the American Philosophical Society, &c. &c. Twelfth Edition, carefully revised. pp. 1704, 8vo. Philadelphia: J. B. Lippincott & Co. 1865.

THE revision of the United States Pharmacopœia in 1863 entailed the necessity of a complete revision of the United States Dispensatory, which is the great commentary upon that national work. In this light has the Dispensatory been regarded during the long period of its useful and successful career, and, viewing the works as inseparably connected, it may be said that the joint issue of the two has constituted the decennial era in the history of the pharmacy of our country. The whole task of revising and preparing for the press this much wanted edition has fallen upon Prof. Wood, in consequence of the lamented demise of his coadjutor, Prof. Bache, who died not long after the publication of the Pharmacopœia. Indeed, we feel ourselves warranted in expressing the opinion that the death of this distinguished medical chemist was partly owing to the fatigue he underwent in preparing that work for publication. For a person at his time of life, the labour was overwhelming, and, instigated by the most conscientious feeling to perform faithfully the duties of the office of Chairman of the Publication Committee, he sacrificed more rest than was prudent in his desire to acquit himself of the obligations which he had assumed. To the memory of Dr. Bache pharmacy truly owes the tribute of gratitude, for he laboured earnestly to promote its interests during his honourable and extended lifetime. In speaking of this event in the preface, Dr. Wood feelingly states that "this deplorable loss, by which long-existing ties of friendship and joint labour have been broken, has thrown the whole responsibility upon the surviving author; and at a time, moreover, when circumstances called for an unusual exercise of judgment, and rendered necessary an extraordinary amount of labour in preparing a new edition."

The causes which have required a thorough revision of the work have been enumerated in the preface. The unprecedented length of interval which had elapsed since the last issue, the eleventh, in 1858, a delay which was caused by the unfinished state of the Pharmacopœias, was a prominent one. Besides that

of our own, which was in progress of thorough rearrangement, the three British Pharmacopœias were in course of consolidation into one. It has since been published under the title of the British Pharmacopœia. Materials entirely new had, from these causes, to be co-ordinated, and the difficulties may be appreciated from the following exposition of them. "The changes made both in our own and the British Pharmacopœias rendered indispensable similar changes in the Dispensatory. One not familiar with the subject can scarcely appreciate the constant vigilance, the unceasing attention, and the minutest details running through every part of the work, which were necessary to obviate confusion and prevent embarrassing mistakes, in making the book conform to the present standards. Not only was it requisite to introduce all that was new, to alter positions in conformity with the changes in the standards, and to notice and discuss all modifications whether in substance or form; but there was a constantly recurring necessity to solve the various practical problems arising from the substitution of a single one for the three former British Pharmacopœias which were referred to, at greater or less length, in almost every page." The work has been extended to the amount of one hundred pages, which were required by the new matter which presented itself. The articles which are new in it are such as Anilin, Calabar Bean, Carbolic Acid, Coal Tar, Peroxide of Hydrogen, Petroleum, Propylamia, Sorghum, Thallium, Upas, &c. These have been added to the appendix, while it may be noticed that some of the articles formerly in the appendix have been transferred to the body of the work, and some formerly in that location have been placed in the appendix. This has been done in accordance with the proceeding of the United States Pharmacopœia, which pursues the rule of advancing or degrading articles as they may or may not bear the practical test of value.

The article under the head of Cinchona we have always considered as a model of research and description. Originally written and published in the *Philadelphia Journal of Pharmacy*, Dr. Wood has never apparently lost sight of this most interesting subject. It may be regarded, as it now stands, as a concise monograph which contains the latest intelligence. Since the original was penned great advances have been made in the accuracy of our information with respect to the botanical origin of the barks, and where doubt formerly existed, our information has become determinate. With respect to those admitted as officinal, certainty may now be found, and the three which are recognized may definitely be attributed to their true source. Thus the pale is derived from the *Cinchona micrantha* and *condaminea*, the yellow from the *C. Calisaya*, and, lastly, the moot point has been settled with certainty by Mr. Howard in attributing the red to *C. succirubra*.

The second part of the Dispensatory may be said to be the Apothecary's Manual; no other work can be substituted for it in the operations of American Pharmacy. In the present edition the detail of processes has been immensely simplified by the necessity of adhering to only two standards. This must prove advantageous in the dispensing of medicines both to the prescriber and apothecary. The accuracy and fulness of directions are too well known to need an exposition.

Thirty-three years ago the United States Dispensatory was first presented to the medical public. In that time twelve editions, numbering thousands of volumes, have been spread broadcast over the land, diffusing its benefits and elevating the standard of the pharmaceutical science of the country. It is questionable whether parallel success has been met with in any other medical production. The origin of this wonderful popularity originated in the necessity that existed for such a guide. It met a want at the time of its first issue and has continued to supply it to the present moment, and we may pronounce positively that during this long career never has it fallen from the level of excellence with which it commenced, and in this last edition it is as fresh and as fully equal to the requisitions of the age as when originally written by the two eminent men who have been its authors.

Dr. Wood acknowledges his indebtedness in the work of revision to two most competent professors of the College of Pharmacy, Drs. Bridges and Wm. Procter, and it may be said that better assistants could not have been selected.

ART. XXV.—*Reports of American Hospitals for the Insane:—*

1. *Of the New York State Asylum, for the fiscal years 1863–64.*
2. *Of the Bloomingdale Asylum, for the year 1864.*
3. *Of the King's County, N. Y., Asylum, for the fiscal year 1863–64.*
4. *Of the New Jersey State Asylum, for the year 1864.*
5. *Of the Pennsylvania Hospital, for the year 1864.*
6. *Of the Pennsylvania State Hospital, for the year 1864.*
7. *Of the Western Pennsylvania Hospital, for the year 1864.*
8. *Of the Maryland Hospital, for the year 1864.*
9. *Of the Mt. Hope Institution, for the year 1864.*
10. *Of the (U. S.) Government Hospital, for the fiscal year 1863–64.*
11. *Of the Missouri State Asylum, for the fiscal year 1863–64.*
12. *Of the Wisconsin State Hospital, for the year 1864.*

1. DR. GRAY, of the *State Lunatic Asylum*, at Utica, N. Y., reports the statistical results of the operations of that hospital for the year ending November 30th, 1864, as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year	267	267	534
Admitted in course of the year	172	147	319
Whole number	439	414	853
Discharged, including deaths	156	133	289
Remaining at the end of the year	283	281	564
Of those discharged, there were cured	59	50	109
Died	30	18	48

Died with phthisis pulmonalis, 13; paresis generalis (*paralytic générale*), 12; exhaustion from mental disease, 7; epilepsy, 1; convulsions, 2; old age and exhaustion, 6; pyemia, 2; paralysis, 3; gastritis, 2.

“Twelve men died from general paresis—a larger number than in any former year. Five of them had been of intemperate habits for a number of years. In three there was a strong tendency to insanity. One was of traumatic origin resulting from a gunshot wound in the head. With one exception, they are said to have been men of strong will and firm determination, but emotional, easily moved to pity, lamentation, anger, and rage. In the majority, no cause could be assigned by the friends; and in those where it was attempted, some trivial occurrence in the early part of the disease which was plainly nothing more than a symptom, was looked upon as the great cause.”

The relation between insanity and tubercular phthisis, and the reciprocal effect of these two diseases, has long been a subject of professional interest. In allusion to ten insane females who died in the course of the year with phthisis, Dr. Gray says: “In some the disease had been of long duration, and the mental disturbance had progressed *pari passu*, with the physical disease, and was, no doubt, dependent upon it.

“In others the phthisical symptoms were developed, and ran their course rapidly, while the acute mental symptoms manifested on admission subsided as the lung disease advanced to a fatal termination; and for some time previous to death, the mind seemed nearly, if not quite, in its normal condition.”

In the 319 cases admitted, hereditary transmission of the disease was found to exist in the numbers and the relation expressed in the subjoined table.

	Men.	Women.	Total.
Maternal branch of the family	16	11	27
Paternal branch of the family	24	16	40
Paternal and maternal branches	6	2	8
Insane relatives	24	15	39
Total	70	44	114

The following extract is taken from the remarks upon the causation of mental disorder.

"It is confessedly no easy matter to determine, in individual cases, the relative influence of physical and moral causes, and in many instances we may, and do fail entirely to discover any cause; yet we can safely affirm that the disease itself is always physical, and that no moral cause is efficient in its development until the disorder of some function or functions shall have been induced by loss of sleep, defective, perverted, or arrested nutrition, or the exhaustion of the cerebral powers by intense or prolonged action. Thus grief, anger, and other emotions and passions, while always impressing and affecting the physical man, cannot of themselves induce the mental state termed insanity. * * * The prolonged mental disturbance called insanity is no more a disease of the mind than is the transient delirium accompanying fever and other affections."

2. There is hardly another hospital in America the patients received at which afford more valuable materials for the thorough investigation of insanity, than do those of the *Bloomington Asylum*; and yet, with one of the ablest of our psychopathists at its head, its reports, from year to year, are confined almost exclusively to a few general numerical statistics.

	Men.	Women.	Total.
Patients in hospital Jan. 1st, 1864	69	72	141
Admitted in course of the year	68	72	140
Whole number	137	144	281
Discharged, including deaths	57	54	111
Remaining Dec. 31st, 1864	80	90	170
Of the discharged there were cured	27	25	52
Died	10	7	17

"The deaths," says Dr. Brown, "were attributable to apoplexy in one case, to general paralysis in one, to disease of the brain accompanied by partial paralysis in two cases, to pulmonary disease in four, to maniacal exhaustion in six, to tetanus, erysipelas, and disease of the kidneys in one case each.

"The usefulness of the Institution, as compared with any former period, has not diminished, while its general prosperity has been greater than for several years past. The number of admissions has exceeded that of any previous year, with a single exception; and the average number of patients resident in the Asylum was larger than at any (previous) time in its history.

"The new building for female patients has been in use throughout the year, and proves in every respect well adapted to its purpose."

3. At the *King's County (N. Y.) Asylum*, in the fiscal year terminating with the 31st of July 1864, the number of patients received, as well as of those who were discharged, is greater than in any preceding year.

	Men.	Women.	Total.
Patients in hospital, July 31st, 1863	151	245	396
Admitted in course of the year	99	110	209
Whole number	250	355	605
Discharged, including deaths	82	109	191
Remaining July 31st, 1864	168	246	414
Of those discharged there were cured	48	58	106
Died	14	25	39

Died with phthisis pulmonalis, 11; exhaustion, 7; epilepsy, 4; general paralysis, 4; paralysis 3; diarrhœa, 2; effusion, meningitis, pericarditis, pneumonia, congestion of liver, tertiary syphilis, senile gangrene, and old age, 1 each.

The cause of mental disorder in nine of the cases admitted, is alleged to have been "War excitement."

"The library," says Dr. Chapin, "has been increased, during the past year, by the addition of twenty-four dollars' worth of books. This sum accrued from the labour of the patients."

The great predominance of the number of female patients over that of males will be noticed. The apartments of the former had become so overcrowded, that the old building erected some twenty or more years ago, for *all* the then

existing patients, has been removed to a place adjacent to the new building, and is to be occupied by females.

4. During the year 1864, according to the report of Dr. Buttolph, which is now before us, "the demand for room" at the *New Jersey State Lunatic Asylum* was very great, "especially so on the side occupied by the women, the number of whom has been disproportionately large."

	Men.	Women.	Total.
Patients at the beginning of the year	162	164	326
Admitted in course of the year	65	100	165
Whole number	227	260	491
Discharged, including deaths	79	79	158
Remaining at the end of the year	148	185	333
Of the discharged there were cured	30	32	62
Died	21	16	37

Deaths from "general or chronic exhaustion of the vital forces," 15; general paralysis, 3; strangulation by food, 2; bilious fever, 1; exhaustion of acute mania, 8; epilepsy, 4; consumption, 1; congestion of lungs, 1; "obscure disease of the brain," 1.

"Nothing of unusual or peculiar interest has occurred during the last year in the character of the cases received, except, perhaps, a larger proportion than have generally been admitted of extreme cases of melancholy and religious despair. This class of cases give us much anxiety, as they are inclined to refuse food, to take little rest either day or night, to maintain the upright posture so much of the time as to exhaust their strength, and in many cases are disposed to suicide. As a reward for our efforts in their behalf, however, several of the cases have been restored or so far relieved as to again enjoy their accustomed tranquillity of mind."

5. Dr. Kirkbride's report of the *Pennsylvania Hospital for the Insane*, for the year 1864, contains the following general numerical record:—

	Men.	Women.	Total.
Patients at the beginning of the year	139	146	285
Admitted in course of the year	100	83	183
Whole number	239	229	468
Discharged, including deaths	102	87	189
Remaining at the end of the year	137	142	279
Of the discharged, there were cured	40	44	84
Died	8	9	17

Deaths from acute mania, 4; apoplexy, 2; epilepsy, 2; pulmonary consumption, 2; dropsy, paralysis, softening of brain, old age, disease of heart, typhoid fever, and "effects of a wound," 1 each.

It will be remembered that in the report of this hospital for the year 1863, it was mentioned that a system of light gymnastics, similar to that of Dr. Lewis, had been introduced into the department for females. "These exercises have been continued steadily during the entire year, once a week during the summer, and twice a week for the rest of that period. * * * At the department for males, too, a large class have received a regular course of instruction."

"These light gymnastics appear, thus far, to be greatly enjoyed by a large number of our household. The class has generally been about thirty, often more, a portion of whom are always attendants, and the interest remains undiminished. Since the commencement, a year ago, there have been sixty-one in the class. Many have obviously been benefited both mentally and physically—all physically—by the exercise, and not a few have joined the class and done well, whose antecedents could not have justified such expectations. Light gymnastic exercises, with a class of proper size, in a bright, cheerful hall, with good music, an appropriate uniform dress, and other accessories to secure general interest, are very different from what they would be, under other circumstances. And it should not be forgotten in other arrangements about hospitals for the insane,

that the surroundings are often almost as important as the thing itself. In the present instance, the gratification given to the spectators is obviously nearly as great as to those actually engaged in the exercises."

A gymnastic hall, 51 by 31 feet in size, and 17 feet high, within, was erected in the course of the year. Its cost, with fixtures and furniture, was five thousand dollars, three thousand of which was contributed by one of the Board of Managers of the hospital.

Under the head of "Objects of Hospitals for the Insane," Dr. Kirkbride incidentally touches upon a subject which has recently been considerably agitated in some parts of the country. We allude to the alleged committal to hospitals for the insane, from interested or improper motives, of persons who are really not of unsound mind.

"As to the suggestion," says he, "that this always painful step (the removal of a friend to a hospital), is often taken from wrong motives, or when no mental disorder exists, I feel bound to say, in justice to those who have had afflicted friends here, that I have no recollection of having met with a single case of the kind among the more than four thousand who have been under my care in this hospital. If such a disposition should exist, or such a wrong be deliberately attempted, I am quite sure that the officers of a hospital would be the first to detect it, the first to rebuke the act, and to insist on proper reparation being made, if it had really occurred. Those who have charge of hospitals regard themselves as the special friends of the patients. If the interests of the patients are in opposition to the interests of any other persons, I trust, and believe, that the officers of hospitals will always be found on the side of the former. There may certainly be errors of judgment on the part of friends, and the officers of hospitals are frequently able to correct these. Both patients and their friends would often be better off, if they could confide more thoroughly in the advice they receive from those whose opinions are at least disinterested. The only cases, in my experience, received or retained in our hospitals for the insane, about whose mental disorder there could be any just question, are the exceptional ones, where individuals labouring under great nervous disturbance solicit admission as a special favour, or of that class of intemperates whose mental difficulty generally disappears in a short time after the disuse of stimulants, but who remain, to endeavour to break off a habit which often proves so utterly intractable, when the individual has access to means for continuing its indulgence.

"It is not to be presumed that in the large number of cases referred to, and the long period during which they have occurred, there should have been no differences of opinion on some of the points under consideration; but it may be stated, as confirmatory of the opinions adopted, and also as showing the enlightened views entertained by our judiciary, that in all the cases that have undergone legal investigation, every patient has been remanded to the care of the institution; showing that there is entire harmony between the statutes of the commonwealth, the practice of the institution, and that "great law of humanity," which a distinguished jurist has justly said, in certain cases, cannot and should not be ignored."

The customary course of lectures and evening entertainments was continued through the usual number of months.

6. The general summary of cases treated at the *State Lunatic Hospital of Pennsylvania*, in the course of the year 1864, is as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year	148	133	281
Admitted in course of the year	77	58	135
Whole number	225	191	416
Discharged, including deaths	74	61	135
Remaining at the end of the year	151	130	281
Of the discharged, there were cured	16	24	40
Died	17	12	29

Died of exhaustion from acute mania, 4; exhaustion from chronic mania, 15; disease of the brain, 4; epilepsy, 4; disease of the lungs, 2.

Aside from the statistics, there is but little in Dr. Curwen's Report of special importance to the physician. In treating of agricultural and horticultural pursuits as applied to the treatment of the insane, he says: "The amount of good which these auxiliaries confer on many of the inmates cannot be estimated in any numerical calculation, being of that character which is known only by its ultimate results. It must be borne in mind, however, that the labour of the insane is a very varying element in all our calculations; and often when most needed, least available. This arises from the variable character of their disorder, their inability to sustain active, regular work, and the fancies and caprices which control so many in such a way as to prevent their performance of any systematic labour. The theory of the regular occupation of the insane is very simple and very easily executed, but the practice, as exemplified in the experience of those who have most thoroughly and most effectively tried it in this country, is complex and expensive."

7. The number of patients at the *Western Pennsylvania Hospital*, in the year 1864, was much larger than in any former twelve-month.

	Men.	Women.	Total.
Patients at the beginning of the year	75	55	130
Admitted in course of the year	54	50	104
Whole number	129	105	234
Discharged, including deaths	44	32	76
Remaining at the end of the year	85	73	158
Of the discharged there were cured	18	18	36
Died	8	2	10

Deaths from epilepsy, 2; exhaustion of chronic mania, 2; chronic enteritis, dropsy, consumption, old age, suicide, and exhaustion of acute mania, 1 each.

In discussing the effects of the convulsion through which the people of the United States have been passing, Dr. Reed says: "In the table showing the supposed causes of insanity of those admitted here, fourteen are attributed to war excitement; but it must be remembered that this, as well as other causes in the table, are those assigned by the friends, and are often very far from the truth, having had no more agency in developing the disease than a thousand other topics over which a deranged mind will wander. After a thorough examination of these cases, I am convinced that all of them were caused by agencies altogether foreign to the war, and that the prevailing excitement simply served to give form and direction to their morbid thoughts."

Upon another subject, one which of late years has been discussed in many reports, the Doctor writes as follows:—

"The commitment to the hospital of those who have been guilty of serious crimes, and have been acquitted on the plea of insanity, and of those who become insane after perpetration of some grave offence against society, is growing into an evil of such magnitude as to require our special notice. The sensibilities and prejudices of those who have been farmers, mechanics, merchants, ministers, or the wives, sisters, and daughters of such, do not become blunted by insanity, but, on the contrary, are often increased. To associate with these, who are innocent of crime, the hardened criminal whose evil passions and grovelling instincts are intensified by disease, is not only a cruelty, but cannot fail to prove an aggravation to their already too painful condition."

8. Dr. Fonerden, in his report for the year 1864 of the *Maryland Hospital*, says: "The house has been full through the year."

	Men.	Women.	Total.
Patients at the beginning of the year	64	51	115
Admitted in course of the year	62	30	92
Whole number	126	81	207
Discharged, including deaths	63	24	87
Remaining at the end of the year	63	57	120

Of the admissions, 56 were for mania-a-potu. Of these, 34 recovered, 1 died, and 1 remains.

Of the insane, 19 recovered, and 11 (4 males and 7 females) died.

"Walking outside in suitable weather, and also carriage-riding, continue to be a part of hygienic management. On many fine days it often happens that nearly all the patients are, a large portion of both morning and afternoon, in various parts of the grounds with attendants."

Chiefly by means of a donation from Dr. William Fisher, the President of the Hospital, the accommodations have been improved by the introduction of water fixtures, bath-rooms, and gas for illumination.

9. The whole number of patients treated at the *Mount Hope Institution*, in the course of the year 1864, is 535. But 117 of these had mania-a-potu. The cases of insanity proper were as follows:—

	Men.	Women.	Total.
At the beginning of the year	112	116	228
Admitted in course of the year	126	68	194
Whole number	238	184	422
Discharged, including deaths	126	70	196
Remaining at the end of the year	112	114	226
Of those discharged there were cured . .	27	26	53
Died	12	15	27

The insanity of twelve of the patients under treatment is attributed to "excitement of the times;" but it is probable that some of these were admitted in 1863, and mentioned in the report for that year.

Of the whole 535, the alleged cause of the mental disorder, in no less than 239 instances, is intemperance. These cases are thus classified by Dr. Stokes, the physician of the hospital.

"Intemperance causing insanity, 35.

"Intemperance causing mania-a-potu, 113.

"Intemperance causing oinomania, 95."

Causes of Death.—Tubercular phthisis, 3; dysentery, 3; senile decay, 4; marasmus, 3; apoplexy, 3; paralysis, 2; typhoid fever, 2; dropsy, chorea, organic disease of stomach, epileptic convulsions, typhomania, exhaustion from maniacal excitement, and hemorrhage from the stomach, 1 each.

Dr. Stokes thus writes of the effects of interviews of the patients with their friends in many cases of recent insanity:—

"So great is the susceptibility to mental impressions in some cases, particularly in the early stage of the disorder, that we have often known a renewal of excitement produced after every interview with their friends. * * * The friends often manifest on these occasions the utmost imprudence and indiscretion. They are often the first to lose their presence of mind and self-possession, and to betray the greatest agitation. They come prepared to pour forth accumulated stores of unpleasant news. They relate to the patient their own domestic troubles and trials, and communicate intelligence the most calculated to produce unpleasant impressions. All this renews the excitement of the feeble brain, and throws into violent commotion its frail and delicate structure."

10. As might reasonably be inferred from the extensive and exciting operations in those spheres whence the *Government Hospital for the Insane* derives its patients, the influx of cases of mental disorder to that institution, though very large in the preceding year, was greatly exceeded in the fiscal year ending with the 30th of June, 1864.

	Men.	Women.	Total.
Patients at the beginning of the year	202	76	278
Admitted in the course of the year	484	25	509
Whole number	686	101	787
Discharged, including deaths	421	15	436
Remaining at the end of the year	265	86	351
Of the discharged, there were cured	282	6	288
Died	66	8	74

Died with "chronic, organic, and functional degeneration of the brain, without other complicative or supervenient diseases before death, 23. Chronic, organic, and functional degeneration of the brain, with epilepsy, 6; ditto, with serous apoplexy, 2; with apoplexy, 1; with *paralysie générale*, 1; with abscess of brain, 1; with tumour of brain, 1; with pericarditis, 1; with typhoid fever, 1; with dysentery, 2; with hemiplegia, 1; with diarrhœa, 2; with phthisis, 2; with meningitis, 3; with pneumonia, 4; with diphtheria, 1. Inanition, 7; diarrhœa, 2; typhoid fever, 1; dysentery, 1; typhomania, 1; phthisis, 1."

Of the 509 cases admitted, 431 were from the army, 18 from the navy, and 54 from civil life.

"The cases of all classes admitted," says Dr. Nichols, "exceed by 42 per cent. those of the previous year, the number and acute character of which were without precedent in the history of the largest American Institutions for the insane. The admissions from the army were nearly 85 per cent. of the whole, and exceeded those received last year by 45 per cent. While the actual admissions of all other classes than the officers and men of the land forces exceeded those of 1862-63 by eighteen (18), the ratio to the whole number admitted each year was greater by $3\frac{1}{2}$ per cent. in the latter year than in 1863-64. Upon the supposition that the number of men under arms did not vary materially in the last two years, it follows that the ratio which the cases occurring in the army bears to the whole number of troops is on the increase.

"The actual admissions from the navy have risen from six (6) in 1860-61, to eighteen (18) in 1863-64, but have not, during a gigantic war, increased in proportion to the increase in the number of officers and men of that arm of the public service. The seaman has a more hardy and unsusceptible constitution than the landsman. In being transferred from the merchant to the naval service, he experiences fewer trying changes in his habits and in the moral influences about him than are involved in a transfer from the workshop and farm to the tented field; and the changes in his condition on shipboard are fewer and less extreme than those which so often and so severely tax the endurance of the soldier in active service. Besides, when a naval recruit is seized with recurrent insanity soon after he has been imposed upon the service, the medical bureau of the navy finds it a practicable duty to discharge him and procure his admission into an institution supported by the community to which his maintenance is properly chargeable. Full one-third of all the cases that have occurred in the naval service during the year have been disposed of in that way, much to the advantage of the government, and without injustice to special communities or individuals. But after all else that may be said in explanation of the small ratio of cases received here from the navy, it is without doubt in the main a logical incident of the wise and efficient administration of a government bureau closely connected with the conduct of the war, which, as far as we have ever heard or known, has enjoyed the rare felicity of an entire exemption from censure by any authority, party, or interest."

The general army hospital, which was opened in 1861, in the eastern wing of this hospital, and conducted by its officers, was discontinued at the close of the official year covered by the report before us.

The general and quarantine naval hospital, in one of the buildings designed for colored insane, is still continued.

11. "Since my fifth report," writes Dr. T. R. H. Smith, of the *Missouri State Lunatic Asylum*, "a dark period has occurred in the history of this noble charity, during which it was compelled to suspend its work of mercy and humanity from October 1st, 1861, to September 7th, 1863."

It appears that on or about the day first mentioned, the hospital was visited by a party of rebels and the furniture and other personal and movable property seized, removed and converted to other purposes, to such an extent as to render a suspension of operations necessary. We are not informed of the particulars of this sacking of a benevolent institution. A special report relating the history of it has been published, but we have been unable, hitherto, to obtain a copy of it.

During the suspension, the statute law imposing a special tax—one-sixtieth of one per cent.—upon all the taxable property in the State, for the support of

the hospital, was repealed. Subsequently, however, when the time arrived at which the establishment might be reopened with safety, a special appropriation of fifteen thousand dollars gave ability to effect that desired object.

	Men.	Women.	Total.
Patients admitted from Sept. 7th, 1863	76	109	185
Discharged, including deaths	17	16	33
Remaining Nov. 28th, 1864	59	93	152
Of the discharged, there were cured	7	8	15
Died	9	5	14

Deaths from consumption, 7; ulceration of bowels, 2; epilepsy, chronic mania, gastro-enteritis, typhoid fever, and erysipelas, 1 each.

A very large proportion of the cases admitted were chronic. Among the more recent, the disease in five was attributed to "war excitement." While acknowledging the remarkable exemption from insanity from this source, in a State which must be reckoned among those most devastated by the rebellion, and attributing that exemption chiefly to "the character of the war itself"—the loyalists being thoroughly convinced of the justice and righteousness of their cause—Dr. Smith says: "May we not anticipate with much certainty a fearful increase in the number (of the insane) when this conflict shall have been closed, and the mass of calamities which will have fallen upon so many shall be felt in all its magnitude? * * * Shall we not expect even a more wide-spread influence in dethroning reason from the demoralizing effects of war and the vast amount of physical disease that will be engendered by dissolute habits, and the legitimate and unavoidable results of overwork, exposure, excitement, and gradual exhaustion, necessarily associated with the long-continued discharge of military duties in camp and in field?"

12. Dr. J. P. Clement resigned the office of Superintendent of the *Wisconsin State Hospital for the Insane*, and retired from it on the 1st of January, 1864. From that time, until the 20th of April, the duties of the place were performed by Dr. J. W. Sawyer, Assistant Physician; and, at that latter date, they were assumed by Dr. A. H. Van Nostrand, who had been duly elected as Superintendent.

	Men.	Women.	Total.
Patients in hospital Sept. 30th, 1863	84	104	188
Admitted in course of the year	59	53	112
Whole number	143	157	300
Discharged, including deaths	64	66	130
Remaining Sept. 30th, 1864	79	91	170
Of the discharged, there were cured			56
Died			17

Died of phthisis, 4; organic disease of the brain, 4; exhaustion of chronic mania, 4; exhaustion of acute mania, 3; general paralysis, 2.

"The entire exemption from the endemic, and epidemic diseases of the country can be attributed to the thorough ventilation of our house, excellent drainage, plain, but wholesome diet, and regular exercise of our patients."

The apartments have been overcrowded, and twenty-five incurable cases were discharged, to make room for curables. Dr. Van Nostrand recommends that the hospital be enlarged, and, as one argument in favour of that object, says: "I am credibly informed that in one bed-room, in the poor-house of one of the wealthiest counties in the State, there are three insane females, chained to the floor or bedstead, never taken out to walk, or ride, or exercise. In another wealthy county, their quarters are less ventilated and more filthy than an ordinary stable."

The longer part of Dr. Van Nostrand's report is devoted to the finances, and the material improvements of the establishment.

P. E.

ART. XXVI.—*The Army Medical Staff, an Address delivered at the Inauguration of the Dale General Hospital, U. S. A., Worcester, Mass., February 22, 1865.* By WARREN WEBSTER, M. D., Assistant Surgeon U. S. Army, etc. Svo., pp. 56. Boston, 1865.

A WELL-INSTRUCTED, and properly organized medical staff is an all-important part of the military establishment of every nation. When clothed with the powers necessary for the faithful performance of its duties, when its counsel is required, and its decisions promptly carried out in all things having a tendency to affect the hygiene of the army, and promote, or lessen the health and vigour of the troops, and increase or impair their efficiency in the field—when to it, also, is committed the sole charge and management of the sick and wounded, the medical staff becomes then an effectual means of sustaining the army, physically and morally, and of preventing the depletion of its ranks by the ailments to which the soldier is almost inevitably subject, when the laws of hygiene are violated in respect to his food or clothing, the place of his encampment, or the construction and locality selected for his barracks. The medical staff of an army is able, and to a greater extent than is generally supposed, to counteract the effects upon life and limb of the several instruments of warfare, and to return promptly to the ranks as an efficient combatant the soldier wounded in the previous battle.

It is essential, however, in order that the medical staff of the army shall be able to do its duty fully in the prevention of disease among the troops, and in its treatment when it has already occurred, that it be rendered supreme in its own department, that it have full control over the sick and wounded, that it have power to command for them everything their condition may demand, whether in respect to accommodation, attendance, food, or medicine, without being made accountable for its acts, save to its own professional superiors. Even in distributing among the different professional officers the details of the medical service of the army, care should be taken to define with sufficient precision the duties of each, in order to prevent any embarrassment or interference. Let each one have the entire responsibility within his own sphere of duties, answerable, however, for neglect or other misconduct to a board, whose members shall be selected from among the medical staff of the army.

Let it not be supposed, to follow the idea, if not the exact language of Dr. Webster, that enlargement of military authority or increased rank, is claimed for the medical officers of the army, as a matter simply of personal distinction. The claim is based upon the sole reason of public good. No one can suppose that increase of rank or authority will, of itself, give soundness to the judgment, clearness to the eye, or dexterity to the hand of the surgeon; nevertheless, when authority, and rank to enforce that authority, are superadded to all needed professional attainments and skill, it will tend to impart that soldierly *esprit*, without which there may be doctors, it is true, but not army medical officers, clothed with full power to prevent, not less than to cure disease and succor the wounded.

The main theme of Dr. Webster's address is the status of the medical staffs of the armies of England and France, and their respective services during the war in the Crimea, and that of the French, alone, in Italy, compared with the organization of the medical staff of the army of the United States, and its efficiency as evinced during the war in Mexico, and that which arose out of the recent rebellion in the South.

This theme has been discussed with ability. The necessity of an adequate staff of medical men, endowed with all necessary power and under the sole control of its own professional officers, to insure the efficiency of our armies, is clearly exposed and fully sustained by a reference to facts which are matters of public record.

D. F. C.

ART. XXVII.—*A Vest-pocket Medical Lexicon: being a Dictionary of the Words, Terms, and Symbols of Medical Science, collated from the best authorities, with the addition of new words not before introduced into a Lexicon. With an Appendix.* By D. B. ST. JOHN ROOSA, M.D., etc. 18mo., pp. 266. New York: Wm. Wood & Co. 1865.

A LEXICON comprising the several terms which constitute medical technology as recognized by the leading authorities of the profession, is an all-important, or, more correctly, an essential part of the library of the medical student. We are not aware, however, that any especial advantage is to be gained by reducing the Student's Lexicon to a size sufficiently small to allow of its being carried in the vest pocket, or how, when presented in this form, it is rendered a more useful companion to "the student attending medical lectures," than it would be were it made a convenient appendage to his reading-table. There are perhaps some who see an advantage in these pocket lexicons that we do not; be this as it may, all, without exception, will agree with us, that a medical lexicon, adapted for the constant use of the student, be it in a volume of small or large dimensions, should contain very few words besides those in common use by the most approved medical writers of modern times, and that these should be defined with conciseness, but, at the same time, with the most perfect clearness and accuracy.

That these essential features are not the prominent characteristics of the little lexicon before us will be evident upon even a cursory examination. It is burdened with terms which are not in common use or countenanced by any very authoritative medical writer, while many of those recognized as belonging to a legitimate medical technology are entirely omitted. Words, also, swell its lists that are used in precisely the same sense out of the profession as they are in it, and of which no one who is not already conversant with the true meaning should be allowed to enter upon the study of medicine. Very many of the definitions, if they can with propriety be called definitions, are, also, exceedingly vague, defective, and obscure, giving, if any, only an imperfect idea of the actual and entire technical meaning of the terms they profess to elucidate, while many others, though plain enough, are positively erroneous.

Our little lexicon gives for the definition of the terms "*benign*" and "*benignant*" "of a mild character." This may, it is true, be assumed as one of their meanings; their true signification, however, is favourable, without irregularity or malignancy. "*Croup*" is most vaguely defined to be "an affection of the larynx and trachea." "*Caloric*," heat. "*Caustic*," "a substance which burns the living tissue," more correctly that kills or disorganizes the animal tissues. "*Cephalæmatoma*," simply "a bloody tumour." "*Dentition*" is defined to be the period instead of the act of cutting teeth. The definition given of "*fever*," is "a state of being hot." "*Gas*," according to our "Vest-pocket Lexicon," is "any aeriform body." "*Anconeus*" is defined to mean "the elbow or extensor of the forearm." Although the word is derived from the Greek *αγκων*, the elbow, it means strictly something appertaining to the elbow, hence it is given as a name to a portion of the triceps brachialis muscle, because situated at the elbow-joint. As the definition of "*ague*," we have simply "intestinal fever;" for that of "*aneurism*," "a dilatation or rupture of an artery," instead of a circumscribed enlargement of an artery, with or without rupture. "*Cardia*," the entrance into the stomach, is defined "the pit of the stomach." "*Cervico-brachial*," pertaining to the neck and arm, is defined, "pertaining to the head and arm." The definition of "*goitre*" is "an enlargement of the *thyroid cartilage*;" that of "*ligneous*," woody, "like wood." "*Liquor*," a fluid or solution, means, we are told, simply "a spirituous fluid." "*Olefiant gas*," carbonic vapour and hydrogen, or, more correctly, a compound of acetyl with hydrogen, is vaguely defined "a vapour of carbon and hydrogen." "*Peccant*," an abnormal condition of the fluids of the body in respect to quality or quantity, is defined simply "not healthy." "*Pyrosis*," a burning pain at the epigastrium, attended often with the

discharge from the stomach of a sour fluid, is defined "the belching" [eructation of wind] "of a thin fluid." "*Pylorus*," the opening from the stomach into the duodenum, is defined "a fold of mucous membrane surrounding opening from stomach to duodenum." "*Resection*," the removal of a diseased or fractured portion of the shaft, or the diseased or shattered articulating surfaces of long bones, is defined "the operation of removing the extremities of long bones." Of the word "*sinus*," the meaning, as it is employed anatomically, is given, but not its meaning as used in surgery. "*Spina-bifida*," a congenital deficiency in one or more of the vertebræ, with the protrusion of a bag or tumour filled with a fluid, is defined "a congenital absence of a portion of the backbone." "*Stillborn*," the anæmic, syncopal, asphyxiated or apoplectic condition of an infant at birth, is defined "dead-born." The meaning of "*tampon*," a plug of any material, is restricted to "*a plug of lint*." "*Technology*" is defined "*a treatise on children*;" technology, here, is probably a misprint for "tecnology" (from *τεχνον*, a child, and *λογος*, a discourse or treatise), a term, however, which is not in common use. The definition given of "*varioloid*," namely, "mild smallpox," is not positively incorrect; it does not, however, indicate the sense in which the term is almost universally employed, namely, a disease, more or less resembling smallpox, occurring after exposure to variolous contagion in one who had been vaccinated or had had smallpox from inoculation or naturally. The meaning of "*vibices*," purple patches under the skin of a narrow elongated form, as though produced by the stroke of a whip, is set down as "marks of a whip." "*Fawning*," an involuntary gaping of the mouth, often, but not necessarily, accompanied with a deep inspiration, is defined "*a deep inspiration*."

The following we presume must be set down as typographical errors: *Alteative*, for *alterative*; *alveoli*, "the socket" [sockets] "for the teeth;" *Kirsch-Wasser*, "a distilled fruit" [liquor] "from the cherry;" *peridysimus*, for *perididymis*; *pleurilocular*, for *plurilocular*; *zonular ciliaris*, for *zonula ciliaris*.

The above are only a few of the defects of the "Vest-pocket Lexicon," sufficient, however, to show that the volume is an unreliable guide for the student to a knowledge of the terminology of the science and the art of medicine.

D. F. C.

ART. XXVIII.—*Report of the Board of Health of the City and Port of Philadelphia, to the Mayor, for 1864.* Philadelphia, 1865. 8vo. pp. 74.

FROM this report we learn that the general sanitary condition of the city of Philadelphia continued to be favourable up to the close of the past year.

The entire number of interments registered was 17,582. Of these, 1,707 were of stillborn infants and persons who died beyond the city limits, 278 of those who died of old age, and 799 of those who died from casualties or from causes unknown, leaving 15,119 as the number of interments of such as had died from actual ascertained disease, including 1,598 soldiers.

Of the whole number of interments, 16,237 were of whites, and 1,309 of blacks; 9,782 were of males, and 7,800 of females.

Of the males, 4,722 were adults; and of the females, 3,472. Total adults, 8,194.

Of the males, 5,060 were children; and of the females, 4,328. Total children, 9,388.

The mortality among adults in 1864 exceeded that in 1863 by 856, or 11.66 per cent.; among children the excess over 1863 was 888, or 10.50 per cent.

Of the deaths, 13,427 were in persons born in the United States, or 76.36 per cent.; and 3,221 were in persons of foreign birth, or 18.31 per cent.; while 934, or 5.32 per cent., were in persons whose place of birth was unknown.

The number of births registered during 1864 was 15,591, being an excess over 1863 of 298, or 1.94 per cent. Of the children born, 8,237 were males, an increase beyond 1863 of 195, or 2.42 per cent.; 7,354 were females, an increase beyond 1863 of 103, or 1.42 per cent.

The coloured children amounted to 242—127 males, 115 females; a less number than in 1863 by 50, or 17.12 per cent.

The *twin births* amounted to 157, being 9 more than in 1863.

Four sets of *triplets* were registered in 1864.

Of *stillbirths*, 788 (462 males, and 326 females) were registered, being an excess over 1863 of 45, or 6.05 per cent.

The number of births in each quarter of the year was:—

First quarter, January to March inclusive,	4,197 = 26.92 per cent.
Second “ April to June inclusive,	3,568 = 22.86 “
Third “ July to September inclusive,	3,775 = 24.22 “
Fourth “ October to December inclusive,	4,051 = 26.00 “

The number of marriages registered in 1864 was 6,752, an increase over 1863 of 1,278, or 23.36 per cent.

The number and percentage of marriages in each quarter of the year was:—

First	1,953 = 28.92 per cent.
Second	1,546 = 22.89 “
Third	1,463 = 21.67 “
Fourth	1,790 = 26.52 “

Of the grooms, 3,784 = 57.63 per cent., were natives of the United States; 2,753 = 42.37 per cent., were foreigners; while of 215 the birthplace is not given.

Of the brides, 4,021 = 61.28 per cent., were born in the United States; 2,496 = 38.72 per cent., were of foreign birth; while of 235 the birthplace is not given.

The following exhibits the returns of births, marriages, and deaths in Philadelphia for the past four years:—

Years.	Births.	Marriages.	Deaths.
1861	17,271	4,417	14,468
1862	14,741	4,662	15,097
1863	15,293	5,474	15,788
1864	15,591	6,752	17,582

At the Lazaretto Hospital there were admitted 173 patients. Of these, 170 laboured under *smallpox*, 1 under *impetigo*, 1 under *typhus fever*, and of 1 the disease was unknown—an infant five weeks old, that died a few hours after admission.

Of the 170 *smallpox* patients, 112 were males, and 58 females; 134 were whites, and 36 blacks.

The admissions into the hospital were during the first quarter of the year, 33; during the second quarter, 52; during the third quarter, 30; and during the fourth quarter, 58.

Of the 173 patients, 29 died; 28 of the deaths being due to *smallpox*, or a little over 6 per cent. of all the cases of that disease admitted.

In speaking of the various sources of disease originating within the city, and the means for their prevention and removal, the necessity of a more perfect and extended system of sewerage is urged upon the attention of the City Councils. In connection with the subject of sewerage, we have, in a very important report from a sub-committee of the Board of Health, a discussion of the propriety or impropriety of allowing the entire discharge, through lateral drains, into the common sewers of every species of domestic filth—including what is now collected in sinks and cesspools—the refuse of manufactories, etc., as has been proposed by the public authorities.

“If,” says the report alluded to, “our present system of cesspools is, in the language of the City Surveyor, ‘an abomination and a nuisance,’ your committee are not without authority for the opinion that the continuance of the ordinance granting permits to connect water-closets with sewers, however perfect may be their construction, will constitute, and more certainly in the future, even with an increased supply of water-power for flushing the sewers, an abomination and a nuisance, tenfold more dangerous to the health and comfort of the citizens than the present cesspool system. The danger we apprehend does not depend so much on imperfectly constructed drains from water-closets and privies as on the

accumulation of the solid and liquid ejecta of the population in the sewers themselves, and the exposure it is subject to at every ebb-tide, both in the Delaware and Schuylkill, as it escapes from the sewer outfalls.

"On this subject, Mr. Cheeseborough, in his Chicago report, writes: 'The greatest actual innovation upon the original use of sewers is the immediate connection of water-closets with them, and the consequent abandonment of privy vaults. This, however, has not become universal in any large city yet, though very general throughout Great Britain for the upper and middling classes of houses. The experience of the last ten years, however, has led many to doubt the propriety of its adoption in all cases. The character and habits of the population, the facilities for flushing the sewers, and the nature of the outfall, in regard to becoming offensive, should be carefully considered.'

"One of the most serious evils connected with our present plan of sewerage is the ever-accumulating amount of its offensive solid contents. This collection, derived from the fluid and semi-fluid refuse of almost every department of industry that can be located within the range of the sewers, both public and private, together with the washing of the streets and alleys, undergoes putrefactive decomposition, and hence becomes the source of virulent and toxicological emanations which escape into the atmosphere, whether at the terminations of the sewers, or through the numerous inlets or other openings into them which occur along their course. The danger from these poisonous gases in this city has been on more than one remarkable occasion fearfully experienced during the advent of the various epidemics of yellow fever, which have usually made their first appearance in the immediate vicinity of the termini of the sewers on the river front, and from these nuclei scattering death and desolation in every direction."

"Your committee do not hesitate to offer it as their opinion that our city is not advantageously located, topographically, to be improved in a sanitary aspect by encouraging and perfecting a system of connecting water-closets and water privy drains with the public sewers. The great difficulty lies in the fact that two sluggish rivers creep along the eastern and western boundaries of the present densely populous and business portions of it; and the tidal currents, unable to bear away the sedimentary matters beyond the power of the returning waters, this half-dissolved putrescent material, with the foul additions gathered in their laggard course, from the rivers themselves and the adjacent shores, is brought back and conveyed by eddies into the docks and on the neighbouring banks, only to rankle and ferment at the reflux of every tide, when it is exposed, contaminating the surrounding atmosphere with its offensive and pestiferous effluvia, which have ever been a well-recognized cause for the nourishment and spread of epidemic diseases. Besides this natural disadvantage, which is without remedy, we may refer also to the defective construction of our old sewers, as regards their inclination, size, shape, and uniformity of level, together with the present limited supply of water-power for flushing the sewers, in the event of satisfactory evidence being afforded that the flushing system would be fully adequate to the task of cleansing them."

D. F. C.

ART XXIX.—*Hand-Book of Skin Diseases for Students and Practitioners.*
By THOMAS HILLIER, M. D., London, etc. etc. With Illustrations. 8vo., pp. 353. Philadelphia: Blanchard and Lea, 1865.

THERE is no class of diseases more perplexing to the student of medicine than those of the skin. From the descriptions, even the most graphic, given in books aided by the best executed drawings, it is scarcely possible for him to acquire such a clear conception of the characteristic features and varying aspects of these diseases in their different stages, as will secure their ready recognition in actual practice. This does not arise altogether from the obscurity of the distinctive phenomena of the several skin diseases when carefully noted in the living subject from the first appearance of the eruption, throughout the several changes it undergoes, whether spontaneously or as the result of the action of

various accidental causes, taking, at the same time, into account the relationship which shall be found to exist between the cutaneous affection and whatever constitutional malady may have been present, previously to its appearance, or may present itself during its course or at its termination.

The difficulty which stands in the way of acquiring an acquaintance with the symptomatology and course of the diseases of the skin and correct views in relation to their pathology generally, has arisen mainly from their having been too generally considered as strictly local in their nature, or as depending in most cases, if not invariably, upon some particular morbid condition of the blood or bile, or of the fluids generally, of the body, overlooking their intimate connection with, if not their entire dependence, in a large number of cases, upon the presence of certain parasitic animal or vegetable organizations. The difficulty is in part due also to the diversity of names that have been given to the diseases of the skin by different authors; to the fact that the same name has been given often to morbid conditions of the surface totally distinct from each other, or to the different aspects assumed by the same cutaneous affection at different stages of its progress, or caused by variations in its intensity, or certain abnormal states of the patient in which it occurs.

To facilitate the study of the diseases of the skin a manual or text-book, clear, accurate, and precise in all its teachings, is an important desideratum. Such a work Dr. Hillier has endeavoured to prepare in the volume before us. It comprises, certainly, a very fair digest of whatever of importance has been furnished to us in relation to the pathology and therapeutics of skin diseases by the older physicians, of the knowledge of these subjects, for which we are indebted to the more recent dermatologists of Europe, and of the results of the author's own experience as physician to the skin department of the University College Hospital, and to the hospital for sick children, London.

The author has to a very great degree simplified the study of skin diseases by avoiding the introduction of new terms, or the use of old terms with a new meaning, and by affixing a definite and invariable signification to every word employed by him.

"All affections attended with eruptions or changes in the health, structure, functions, or colour of the cutis or its appendages, the cuticle, the nails, and the hair," remarks Dr. H., "are really diseases of the skin. A large number of these are dependent on constitutional disease. In some the latter is not very important, whilst in others the external local disease is an unimportant part of a serious general illness. There are some general diseases which, although accompanied with characteristic eruptions on the skin as a part of their anatomical characters, are most conveniently described as constitutional maladies; such diseases are smallpox, scarlet fever, and measles." With great propriety there might be included in the same category certain forms of erysipelas, especially when the disease occurs epidemically.

Dr. Hillier does not enter into a full consideration of the specific eruptive febrile diseases, but confines his notice strictly to the eruptions with which these are accompanied. In the same manner the syphilitic skin diseases are described only so far as to enable the student at once to recognize the various eruptions met with in secondary and tertiary syphilis, while no attempt is made to treat at length the subject of constitutional syphilis.

Ulcers might, strictly considered, be classed with diseases of the skin; their entire consideration, however, the author has left for books on surgery.

The endless variety in the classification of skin diseases adopted by different teachers, the very dissimilar basis upon which each is constructed, and the minute divisions by which they are all mystified and obscured have added not a little to the many other difficulties encountered by the student in his endeavour to acquire a knowledge of their characteristics, their nature, their causes, and their treatment.

The system of classification adopted by Dr. Hillier is founded partly on the natural affinities of the diseases, and partly upon Willan's principle of elementary lesions. He arranges all affections of the skin under four main divisions: 1st, parasitic; 2d, acute specific infectious diseases; 3d, syphilides; 4th, other diseases. In the distribution of the *syphilides* and other diseases, he follows

mainly Willan's principle, but among the syphilides he has introduced, in addition, the vegetating, pustulo-crustaceous, and ulcerating; and amongst *other diseases* he has included hemorrhagiæ, diseases of the sebaceous glands, and heteromorphous exudations. He has omitted tuberculæ as an ambiguous term; instead he has made a genus of *hypertrophies* and *degenerations*. He has also dropped the term bullæ, and included the diseases to which it has been applied among the vesiculæ.

The work of Dr. Hillier will unquestionably serve the student as a useful and faithful guide to the acquirement of a knowledge of skin diseases. Nor will the practitioner, who has not had his attention early directed specially to these diseases, find the work entirely beneath his notice.

The treatment laid down by the author is simple, rational, and in accordance with the results of an extended experience. Dr. H. avoids all unnecessary multiplication of remedies, and rejects all of doubtful value. The absolute necessity is insisted upon, of studying the several abnormal conditions of the skin in their connection with the diseases of the internal organs, and of the organism at large, as the only guide to a rational and successful therapeutics. The error of supposing that the normal condition of either can be restored while the other remains diseased, constitutes one of the most formidable stumbling-blocks in the road to a successful management of skin diseases. The fact that the healthful performance of the cutaneous functions is essential to the healthful performance of the functions of every other organ, and, conversely, must be kept prominently in mind or our clinical ministrations will do little good if they be not often productive of mischief.

D. F. C.

ART. XXX.—*Induced Abortion, on Account of Extreme Narrowness of the Pelvis. Prize Essay of the Medical Faculty at Tübingen.* Abridged and Published by FERD. RATTENMANN, M. D., formerly—during three years—Assistant Physician at the Lying-in-Hospital, at Tübingen. 8vo. pp. 51. Philadelphia, 1858.

A most important question presents itself to the obstetrician, in reference to those cases of deformed pelvis in which the diameters of the upper strait are so far reduced as to preclude the possibility of a living child being born at the full time by the unaided powers of nature. The question to which we refer is, When, in such cases, pregnancy takes place, what can be done to save the life of the mother, or of the fœtus, or of both? To save both mother and child, three measures have been proposed—the application of the forceps, the bringing on of premature labour, and the Cæsarean section. To save the mother by the sacrifice of the infant compression of the head of the latter by an appropriate instrument, and craniotomy have been suggested and practised. There may, however, occur cases of deformed pelvis in which the diameters of the superior strait are so narrow that the application of the forceps is impossible, while compression of the head to a sufficient extent to allow of its passage through the contracted pelvis, as well as craniotomy, would be attended with almost insuperable difficulties. In such cases the possibility of effecting premature delivery at a period of gestation sufficiently advanced to afford a fair chance for the survival of the child is at best problematical; leaving, therefore, the obstetrician no other alternative than either to resort to the Cæsarean section, and by it endeavour to save the lives of both mother and child, or to induce abortion at some period previous to the sixth month, and by thus sacrificing the life of the fœtus to secure that of the mother.

In the publication before us the latter procedure is very strongly advocated as more uniformly safe to the mother, and in all respects more advantageous, than to wait until the termination of pregnancy, and when natural parturient efforts ensue, to endeavour to effect the delivery of the child by reducing the

size of its head by compression or craniotomy, or by resorting at once to the Cæsarean section.

It is almost universally conceded that, in cases where the shortest diameter of the pelvis is less than $2\frac{1}{2}$ in., parturition is absolutely impossible without the destruction of the life of the child by craniotomy, or without endangering that of the mother by the Cæsarean section, and it is in these cases that the author of the essay considers the induction of abortion to be, under all circumstances, indicated.

We agree with Dr. Tyler Smith, that, whenever the condition of the mother is such as to render her death imminent, unless the contents of the uterus are promptly evacuated—whatever may be the cause from which such condition has resulted, whether diseased conditions of the general system, of the uterus, brain, heart, or other organs, whether deformities of the pelvis or pelvic tumours, it becomes right and necessary to bring about the premature expulsion of the ovum by artificial means. While, in every case, this should be deferred to as late a period as possible of gestation, in order to afford a chance for the survival of the child after its expulsion, the latter consideration, though an important one, should never, however, be allowed to interfere in the slightest degree with the safety of the mother. The possible, but always unassured life of the embryo, cannot, with propriety, be put in competition with the positive and far more important life of the mother.

In making up our decision between the claims of the two operations—induction of abortion, and the Cæsarean section—we are urged in the essay before us to take into consideration the fact that by the first procedure the safety of the mother is certainly secured, while that of the fœtus is not in every case necessarily destroyed; whereas by the second the life of the fœtus is secured only by subjecting that of the mother to a serious and unwarrantable risk. In view of this consideration the author of the essay is in favour of subjecting all patients, even those who are pregnant for the first time, to the operation of induced abortion, in whom the operator has convinced himself of the extreme narrowness of the pelvis; when, upon admeasurement, he finds the shortest diameter to be but two and a half inches or under. But especially is the operation advisable in those females whose previous natural labours had been interfered with in consequence of the contraction of their pelvis, and had always terminated in the death of the child.

In most cases of deformed pelvis it is the antero-posterior diameter which is reduced in size. On entering the strait of the pelvis the head is generally in such a position that its transverse (bi-parietal) diameter corresponds with this antero-posterior diameter of the pelvis, consequently it is a knowledge of the measurement of this latter diameter that is of most importance in solving the question as to the propriety of the induction of abortion. We are not, however, in judging of the indications for the operation, to neglect the size of the transverse diameter, or the general form of the whole pelvis; the dimensions of the different portions of its cavity, and the relative dimensions of the fœtal head at the different stages of its development. This is absolutely necessary in order that we may not be led to bring on abortion at a period of gestation when the head of the child has already become so far developed as to surpass in size the actual diameter of the pelvis.

In comparing the operation of induced abortion with the Cæsarean section, while the first is considered as almost without danger, the ratio of mortality of the latter is placed at 70 per cent. This we cannot but consider as an exaggeration. To induce abortion may be, and certainly is, in the great majority of instances, a much less dangerous operation than the Cæsarean section, still it is not entirely devoid of risk. In judging of the mortality of the Cæsarean section, we are to recollect that the operation has unquestionably been performed, in a large number of cases, as a last resource, after the patient had become exhausted from the sufferings of many hours' severe but ineffectual labour, or under other equally unfavourable circumstances, hence its statistics, including all the cases in which it has been resorted to, present certainly anything but encouraging results; but, taking only those cases in which its performance has been well timed, and in patients placed under favourable hygienic cir-

cumstances, it will be found, we think, to be attended by a far less proportion of deaths than that set down in the essay before us. Under all circumstances, however, it is an operation, the magnitude and danger attendant upon which are sufficient to render the obstetrician willing to exchange it for one to which the same amount of objection is not applicable. Such is unquestionably the induction of abortion.

"Hitherto," it is remarked, "it appears that we have not dared to receive the induction of abortion as one of the obstetric operations, and only because we had no cases of precedent to guide us. Thus it happened that this operation was altogether limited to those cases where disease threatened to kill the mother, if the embryo was allowed to exist any longer. On the contrary, in extreme narrowness of the pelvis, physicians were always ready with the Cæsarean section. In those diseases which would absolutely destroy the life of the mother the induction of abortion was considered justifiable, because it was effected to save the life of the mother. The permission of inducing premature labour was also extended to those cases where disease was to be alleviated, which could only be checked for a time. They, therefore, sacrificed the embryo to the interest of the mother, although the advantage to the mother was but of short duration. But is not an extreme degree of narrowness of pelvis, which prevents parturition, most dangerous to the mother? and by what other means can this morbid condition be relieved, unless by the induction of abortion? Besides this, the mother is most desirous to have an abortion induced, that she may escape the fatal dangers and the horrid pains of the Cæsarean section. Why should we hesitate in this case to destroy the child, when our object must be permanently to preserve the life of the mother, and why should we not respect her just claims."

The reports of its successful results, derived particularly from the practitioners of France, are urged in favour of the operation. Thus Dubois, Cazeaux, Lénor, have performed it several times with the best results, and even all three on the same individual without the occurrence of any unfavourable symptoms.

The induction of abortion and of premature labour is a painless and easy operation. It is performed without any sharp instruments or those which endanger laceration of the uterus or vagina, while the interference with the pregnant womb may be so gradual and gentle as to avoid all injury to it. The operation is therefore considered to be comparatively without danger.

"Moreover," it is remarked, "abortion, unlike all other operations, has the advantage that it may be performed in all constitutions. Even the utmost degree of narrowness of the pelvis is no obstacle, because we possess numerous means of inducing abortion, all gentle applications, and because we are not obliged to introduce voluminous instruments through the straits of the pelvis. On the other hand, the embryo, at the time favourable for abortion, is so little developed, that it will easily pass through the straits of the pelvis if the indications are correct."

In the essay, the most advisable period for the induction of abortion is considered to be at the end of the sixth month, whenever the contracted dimensions of the pelvis justify it; as it is not entirely impossible, experience teaches us, for the fœtus at this period of gestation to be brought into the world alive, and in a condition to enable it, with care, to be reared.

The induction of abortion has been objected to from the hemorrhage which is liable to attend and succeed it, and the liability to retention of the placenta. In respect to hemorrhage it is believed that the danger resulting from it is not of a character that should deter us from the performance of the operation, especially after the fifth month, in cases that imperatively demand it. Professor Breit, it is stated, induced, during the period Dr. R. acted as his assistant, seventeen premature labours in the Tübingen Hospital without a single considerable hemorrhage taking place. He asserts, also, that the dangers of the placenta remaining behind in the cavity of the uterus have been exaggerated by former authors.

"The rare occurrence," he says, "of considerable hemorrhages, as well as the easy detaching of the placenta in abortion, are distinctly shown by our experience in spontaneous abortions, and induced premature labour. It has also been

observed that the discharge of the placenta is not only *not delayed*, but in most cases is effected with great ease.

"That the hemorrhages in case of abortion are not so formidable is sufficiently proved by the fact that frequently women, particularly unmarried ones, in whom the too frequent coition destroys the work of love, miscarry spontaneously with so much facility, that the whole occurrence appears to them as a profuse menstruation, and that they continue to attend uninterruptedly to their daily avocations."

In regard to the recovery of the patients who have been the subjects of induced abortion, general experience, according to our author, shows it to be, in all cases, favourable.

"In the induction of abortion," it is shown, "that it is, by no means immaterial in what manner nature is compelled to perform this act. It should only be stimulated in a mild and careful manner, so that abortion may resemble natural labour as much as possible. The best way to obtain the object would probably be to proceed as in the induction of premature labour.

"I. *Preparation*. Baths, opening medicines, injections, venesection (irritation of the mammae by blisters?), circular friction of the fundus uteri.

"II. *The induction itself*.

"(a.) Rupturing the membranes—Method of Scheele.

"(b.) Gradual dilatation of the os uteri by means of a sponge—Method of Brunninghausen, Kluge.

"(c.) Plugging the vagina (Schöller).

"(d.) Injections into the vagina by the ascending douche (Kiwisch).

"(e.) Injections into the uterus (Kohen).

"(f.) Galvanism.

"(g.) Medicines: *Secale cornuti*, borax, extract of belladonna, hb. sabinæ, etc.

"Besides the above methods, different nations have different ways of inducing premature labour. Thus Dr. Aslarin, Mexico (Ojaca), says, that the women there make a person knead their abdomen with the fists until labour pains follow. Similar manipulations, though of a milder character, such as tightly bandaging the abdomen, etc., called *Ampoekoe*, occur also among the Asiatic nations. The latter method is said to have been lately frequently applied with success, and strongly recommended by Dr. Lackenmaier."

One of the strongest objections that occurs to our mind, against the favourable reception of the operation of induced abortion, in cases of extreme contraction of the pelvis, is the facility with which it may be converted into a screen to enable the practice of criminal abortion to be carried on with impunity. That its approval by the profession may lead to a train of abuses is admitted in the essay under notice, and to guard against this, it is suggested that in every case in which the induction of abortion is found necessary to save the life of a pregnant female, the counsel and approval of several able physicians should be required in order to warrant its performance. This might possibly be sufficient to guard the operation against abuse, in a country where the medical profession had a legally recognized status, and its members certain definite fixed and adequate qualifications, and where it could not be encroached upon by any and every charlatan or ignorant pretender; but in the United States, where our profession is, to a very great extent, entirely ignored by the laws, so far as protection, at least, is concerned, and the name of physician, surgeon, or accoucheur may be assumed by any and every one according as interest or whim shall suggest, the provision just suggested would be worse than futile. But little difficulty would be found in getting together, by collusion, several legally recognized "able accoucheurs," very willing, "for a sufficient price," to approve of the performance of an operation by one of their number in any case or for any purpose whatever.

Happily, cases of such extreme narrowness of the pelvis as to call for a resort to either induced abortion, premature labour, or the Cæsarean section, are as yet of very rare occurrence in this country, consequently there is a less imperative necessity for an early decision as to the comparative propriety of the one or the other of these measures. Speaking for ourselves, we have no hesitation to candidly confess that, in view of the dangers to be apprehended from the

introduction of induced abortion as a legitimate operation in the cases in which it is recommended by the author of the prize essay, we should prefer waiting until the completion of the full period of utero-gestation, and immediately upon the indications of the commencement of labour presenting themselves, to resort to the Cæsarean section.

D. F. C.

ART. XXXI.—*The Renewal of Life. Lectures: Chiefly Clinical.* By THOMAS KING CHAMBERS, M. D., Physician to St. Mary's and the Lock Hospitals, &c. From the third London edition. 8vo. pp. 638. Philadelphia: Lindsay & Blakiston, 1865.

IN our number for April, 1863 (p. 387, *et seq.*), we reviewed this work, and the favourable opinion we there expressed of it has been confirmed by the exhaustion of two editions in Great Britain in as many years.

Having already pretty fully discussed the views of the author as given in his first edition, all that is necessary here is to notice the changes which he has made in the present one.

The greater part of the original first lecture has been omitted and the remainder interpolated elsewhere, and many remarks have been dovetailed in the various lectures first published. But what adds most to the value of this edition is the introduction of twenty-three new lectures, three given at the College of Physicians, and the others at St. Mary's Hospital.

We are pleased to see these lectures rendered accessible to the profession in this country, for though, as already stated, we conceive the author's views in many respects open to criticism, still it is a work well calculated to awaken thought and inquiry in a right direction.

ART. XXXII.—*Lectures on Surgical Pathology, delivered at the Royal College of Surgeons of England.* By JAMES PAGET, F.R.S., Surgeon Extraordinary to Her Majesty the Queen, &c. &c. &c. Revised and edited by WM. TURNER, M.B., Lond., F.R.C.S.E., Senior Demonstrator of Anatomy in the University of Edinburgh. Third American edition. 8vo. pp. 737. Lindsay & Blakiston. 1865.

WE hail with pleasure the appearance of a new edition of this classical work by Mr. Paget, which must be regarded as one of the most valuable contributions to surgical pathology since the days of John Hunter.

This edition has been revised and edited by the author's former pupil, Mr. Turner, but under the immediate supervision of Mr. Paget, who states, "I have so worked with him as to be equally with him responsible."

QUARTERLY SUMMARY
OF THE
IMPROVEMENTS AND DISCOVERIES
IN THE
MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Structure of the Nervous Tissue.*—Dr. ROUDANOVSKY makes his sections of the nervous substance, when frozen, with a double-edged knife; colours them with a watery solution of cochineal, and then covers them with Canada balsam. He says that, in transverse section, the primitive elements of the nerves are pentagonal or hexagonal tubes. Their walls of connective-tissue appear as a network, leaving, in some places, between the tubes themselves and between the bundles of tubes star-shaped closed cavities (reservoirs), by which the nutrition of the nervous elements is effected. The isolation of nerve-tubes is an artificial phenomenon. The cylinder axes, as well as the walls of the tubes, are coloured by cochineal. The cylinder axes are seen in the centre of the tubes as knotty fibres. The cylinder axes give off transverse fibres, which pass through the walls and communicate with similar fibres of other cylinders. In the length of a cylinder axis the transverse fibres of a section of the cylinder axis are given off at nearly equal distances. The transverse fibres are found in the anterior and posterior roots of the spinal nerves, but, perhaps, they are wanting in some nerves. The cylinder axes are surrounded in the nerve tubes by the white substance, which is hardly ever coloured by cochineal, and which in Canada balsam preparations always appears as an amorphous granular mass. In the composition of a bundle of tubes enter large, and fine, and finest tubes. Of the fine and finest tubes the number varies in the different nerves and in their different bundles. They are found particularly in the posterior roots of the spinal nerves, and have the same structure as the large tubes with their cylinder axis. The fine and finest tubes very probably belong to the brain, where they are the predominating, if not exclusive, elements of the white substance. Every nerve contains at once an anatomical substratum of the brain, of the spinal cord, and probably of the ganglions.

In fine sections the gray substance always appears diaphanous, and of a yellowish-gray colour, due particularly to the absence of myeline, giving a dull appearance to the white substance, of opacity. In preparations made with gelatine the myeline appears as fat drops, or sometimes as granular drops. The gray substance of the central organs is composed of cells and nerve fibres like their prolongations or branchings; the white substance of tubes with the characters of those in the nerves. The nerve cells should, without doubt, be considered as the origin of the nerves. They differ in size and shape, in having or not having prolongations, and in the number of the latter. In some parts of the central organs the nerve cells unite by some of their prolongations, thus forming a mesh, at the angles of which are the nerve cells themselves, and thus forming the network of nerve cells. In many parts of the central organs, the

tissue of the gray substance shows meshes formed exclusively of nerve fibres, forming a network of the fibres. On the surface of the optic thalami, these bundles of fibres bend in opposite directions, forming a special arrangement of the meshes, as a network of the knots. Meshes or network of gray substance are an essential characteristic of the central parts, as much as a differing direction of the bundles of the fibres of the gray substance, and of the bundles of the nerve tubes of the white substance. From this it follows, that some of the nerve fibres of the gray substance curve or bend in the white substance in which they appear as the cylinder axis in the tubes of this substance. In nearly all the spinal cord, the general law of the structure of the central organs is observed, the fibres of the gray substance being in opposite direction to that of the tubes of the white substance. The nerve cells communicate by some of their prolongations in the group in which they are found, whether in the posterior or the anterior cornua. Some of the branches of the nerve cells, passing transversely to the axis of the spinal cord, bend inwards and become parallel to this axis, and go to form cylinder axes in the tubes of white substance. There are nerves which leave the central parts of the brain and spinal cord, as tubes, and others that are not so.

In cats, dogs, and rabbits the alterations produced by poisoning by nicotine were indicated by the extreme pigmentation and destruction of the nerve cells, and their prolongations only in the spinal cord where the vagus and hypoglossal nerves arise. The reservoirs also increase in size. Death is effected not only by chemically altering the metamorphosis of the whole organism, but by destroying the little organs such as the nerve cells, which are the origin of the nerves of the chief organs of life. Opium and chloroform act on the myeline, which instead of assuming the granular amorphous form has the appearance of little brilliant bodies.—*Brit. and For. Medico-Chir. Review*, April, 1865, from *Gazette Médicale de Paris*, December 24th, 1864.

2. *On the Rapidity of the Passage of Crystalloid Substances into the Vascular and Non-Vascular Textures of the Body.*—Dr. HENRY BENCE JONES has communicated to the Royal Society the following results of some observations lately made by him on this subject:—

“It occurred to me that it might be possible to trace the passage of substances from the blood into the textures of the body by means of the spectrum-analysis, and with the assistance of Dr. Dupré some very remarkable results have been obtained.

“Guinea-pigs have chiefly been used for the experiments. Usually no lithium can be found in any part of their bodies. When half a grain of chloride of lithium was given to a guinea-pig for three successive days, lithium appeared in every tissue of the body. Even in the non-vascular textures, as the cartilages, the cornea, the crystalline lens, lithium could be found.

“Two animals of the same size and age were taken; one was given three grains of chloride of lithium, and it was killed in eight hours; another had no lithium; it was also killed, and when the whole lens was burnt at once no trace of lithium could be found. In the other, which had taken lithium, a piece of the lens $\frac{1}{10}$ th of a pin's head in size, showed the lithium; it had penetrated to the centre of the lens.

“In another pig the same quantity of chloride of lithium was given, and in four hours even the centre of the lens contained lithium.

“Another pig was given the same quantity, and it was killed in two hours and a quarter. The cartilage of the hip showed lithium faintly, but distinctly. The outer portions of the lens showed it slightly; the inner portions showed no trace.

“To a younger pig the same quantity was given, and it was killed in thirty-two minutes. Lithium was found in the cartilage of the hip; in the aqueous humour; distinctly in the outer part of the lens, and very faintly in the inner part.

“In an older and larger pig, to which the same quantity was given, lithium after one hour was found in the hip and knee-joints very faintly; in the aqueous humour of the eye very distinctly; but none was found in the lens, not even when half was taken for one trial.

"Chloride of rubidium in a three-grain dose was not satisfactorily detected anywhere. When twenty grains had been taken, the blood, liver, and kidney showed this substance; the lens, when burnt, all at once showed the smallest possible trace; the cartilages and aqueous humour showed none, probably because the delicacy of the spectrum-analysis for rubidium is very much less than that for lithium.

"A patient who was suffering from diseased heart took some lithia-water containing fifteen grains of citrate of lithia thirty-six hours before her death, and the same quantity six hours before death. The crystalline lens, the blood, and the cartilage of one joint were examined for lithium: in the cartilage it was found very distinctly; in the blood exceedingly faintly; and when the entire lens was taken, the faintest possible indications of lithium were obtained.

"Another patient took lithia-water containing ten grains of carbonate of lithia five hours and a half before death: the lens showed very faint traces of lithium when half the substance was taken for one examination; the cartilage showed lithium very distinctly.

"I expect to be able to find lithium in the lens after operation for cataract, and in the umbilical cord after the birth of the fœtus.

"A patient of Mr. Bowman's, with a double cataract, was given lithia-water with twenty grains of carbonate of lithia seven hours before the operation on one lens. Lithia was present in each particle of it. After seven days the other lens was examined, and no trace of lithia could be found in it."—*Med. Times and Gaz.*, May 13, 1865.

3. *On Some Laws of the Production of Twins.*—Dr. J. MATTHEWS DUNCAN has published (*Edinburgh Med. Jour.*, March, 1865) an account of some interesting investigations on this subject, in which he endeavours to demonstrate the following conclusions:—

"1. The largest number of twins is produced by women of from twenty-five to twenty-nine years of age; and on each side of this climax of fertility in twins there is a gradually increasing falling off in their number, as age diminishes on the one side and increases on the other.

"2. Twins are not regularly distributed among births generally; their production, therefore, is not subjected to the same laws as govern ordinary fertility.

"3. The mean age of twin-bearing mothers is greater than that of mothers generally.

"4. Twins increase in frequency as mothers become older. This forms a striking contrast to the fecundity of a mass of wives (not mothers) which diminishes as their age increases.

"5. Newly-married women are more likely to have twins the older they are.

"6. While the fecundity of the average individual increases with age till twenty-five is reached, and then gradually diminishes, there is some probability that the opposite is true, so far as regards twins alone, fertility in twins being greatest when fecundity is least, and *vice versa*.

"7. The actual number of twins born of a mass of women in different pregnancies decreases as the number of the pregnancy increases.

"8. The number of twins relatively to the number of children born in different pregnancies increases with the number of the pregnancy. In other words, a woman is more likely to have twins in each succeeding pregnancy than in the former pregnancy. The first pregnancy perhaps forms some exception to this rule.

"9. In an individual twin-bearing is, of course, a sign of high fertility at the time. It also, in a mass of women, shows a high amount of fertility, at least, till the time of the birth of the twins.

"10. It is probable, though not proved, that twin-bearing women have larger families than women uniformly uniparous."

¹ It is not easy to get a regular view of Hugenberger's statistics of twins. But a study of them leads me to entertain some doubt of this exceptional character of first pregnancies.

4. *Precocity*.—Dr. PIAZZA states (*L'Imparziale*) that he was called, in May, 1862, to see a child twenty-nine months old who was menstruating; the discharge presented all the appearances of the menstrual fluid and reappeared the following month. The external genitals were covered with brown hair, the mammae and nipples were well developed. Instances of still earlier puberty have been recorded.—*Revue de Thérapeut. Méd.-Chirurg.*, 1 June, 1865.

MATERIA MEDICA AND PHARMACY.

5. *Therapeutical Action of Digitalis*.—Dr. WILLIAM MURRAY has published (*Med. Times and Gaz.*, March 18, 1865) some interesting observations on this subject. Digitalis, he remarks, has a special action on three separate organs—the brain, the kidneys, and the heart; in proof of this, witness its decided action in delirium tremens, in dropsy, and in various forms of heart disease.

Dr. M. states: “I have carefully observed from twenty to thirty cases of cardiac disease treated by digitalis, from which the following conclusions have been drawn; some of these will be quoted as very decided cases, showing the true action of the medicine. As the proposed explanation of the action of digitalis accords fully with the ingenious and well-supported theory put forth by Dr. Anstie in his work on *Stimulants and Narcotics*, it may be well to say that he holds that all true stimulants tend to bring tissue action to its normal standard; that when such action is in excess a true stimulant will reduce it, and when below par will bring it to its proper level; he proposes ‘that the word stimulant be restricted to agents which, by their direct action, tend to rectify some deficient or too redundant natural action or tendency.’ I believe that the action of digitalis, when properly investigated, will confirm these views; and at the same time the investigation of its action will be materially assisted by bearing them in mind. I shall show—

“1. That digitalis will stimulate and strengthen a weak heart, and that the weaker the muscular tissue of the heart the safer will be the administration of the medicine.

“2. That in a hypertrophied heart it will fail to reduce the pulse either in frequency or strength, and in such cases will prove dangerous.

“3. That in a weak organ, acting because of its weakness with great rapidity, it will reduce the number of its contractions, and, as it were, strengthen or tone them down. To strengthen and quicken the action of a weak, slowly acting heart, and to reduce the number of the rapid strokes of a feeble heart, is, according to Anstie, to do the work of a true stimulant, bringing action up to the normal standard on the one hand, and reducing it to that level on the other.

“I. The following case is one of many in which the remedy has removed irregularity and intermission of the pulse, has given power to the heart when exceedingly weak, and increased the rapidity of its action:—

“A lady, aged 50, had suffered for nine years from cardiac disease, and was in an extremity of suffering when I first saw her, having a very largely dilated and weak heart, whose cavities were overladen with blood, and considerable disease of both aortic and mitral valves. A confused tumbling and heaving impulse was all that could be felt in the cardiac region, and feeble blowing murmurs supplanted the natural sounds of the organ. There was no pulse at the wrist, and the large vessels in the limbs had scarcely a pulsation in them.

“A dropsy of the legs and belly was making fast progress, and the usual stimulants and diuretics had failed to give relief. Although thus pulseless and faint, with the heart in so weak and burthened a condition, I prescribed digitalis in doses of ten drops and upwards. In a day or two the organ began to beat more forcibly, the pulse came again at the wrist, the turbulent or confused action became replaced by a quiet, steady stroke, the breathing, before laboured, became easy, and the dropsy began to disappear. In a week the patient was out of bed, and very shortly she so far recovered as to go about in her usual way. After

this she lived for more than a year in comparative comfort and good health, when suddenly the organ again failed, and before digitalis could be administered she died.

"I might add to this cases of aortic regurgitation with dropsy; many cases in which both aortic and mitral orifices were diseased, with dilatation of the walls of the heart, and a weak, irregular pulse at the wrist; cases of simple weakness of the organ, without appreciable disease; cases of dyspnoea from an emphysematous state of the lungs and sluggish pulmonary circulation; all of which were most decidedly benefited by digitalis. I would especially direct the attention of the profession to the use of the drug in cases of bronchitis depending on sluggish circulation, with weakness of the heart's action and emphysema of the lung.

"I have alternated the use of digitalis with the strongest of our stimulants in some of these cases, and have been astonished at the superiority it possesses as a stimulant. From the observation of a few cases in which the drug has been given continuously for a lengthened period, I do not find anything like failure of the heart's action to occur under a month or six weeks, and then a few days of intermission will clear the way for a fresh course of the medicine. In dyspnoea the relief obtained is sometimes most marked. I remember a poor girl with frightful disease of the mitral orifice, having to rest on almost every doorstep on her way to my house, who was so relieved by digitalis as to walk to and fro with ease. I do not think, after trying it in almost all the affections of the heart, that there is a single disease or condition of that organ, *attended by weakness*, in which it may not be given with safety and benefit.

"II. The next condition to which I would refer is that of hypertrophy. In this my experience is not large; but in one uncomplicated case of hypertrophy of the left ventricle without valvular disease, in a man who had an almost Herculean frame, digitalis was fairly and carefully tried. The heart's action in this case was rapid and at the same time very forcible; the digitalis not only failed to reduce this, but it caused an increase in the symptoms, and the patient almost fainted after trying it for one week, so that the medicine had to be changed to tinct. verat. virid., from which decided benefit was derived. I might say that a converse experiment was tried in a boy with mitral disease and rapid action of the heart. Here tinct. verat. virid. failed to give the relief which was most effectually derived from digitalis.

"III. Lastly, as a cardiac stimulant, digitalis ought to reduce too great rapidity of action, *when this depends on weakness*. In this respect the drug has been well tried, and almost universal testimony to its value has been given.

"In inflammatory diseases, in fevers, in phthisis, it is acknowledged to reduce the rapid pulse. In one case of phthisis at present under my care it does this, and most materially lowers the temperature of the body and relieves the daily hectic paroxysm. While, however, it checks the excessive rapidity of the heart's action, it does not therefore weaken its force; so that, as a true stimulant, it brings the organ down to a slower rate of action, but at the same time affords it more power to do its work.

"Thus it appears that the *physiological* action of digitalis is that of a stimulant, in Dr. Anstie's sense of that term; and that in its *therapeutic* properties it is especially useful in cardiac weakness, whether that weakness be accompanied by extremely slow or extremely rapid action. Further, its physiological action as a stimulant may be explained by supposing that in the case of the slow heart it improves the molecular arrangement of the sarcous elements, or that it excites the nerve centres from which the nervous power of the heart is derived; and in the case of the weak but rapid heart it acts by strengthening that regulating or restraining (vital) influence which, while maintaining the activity of tissues at a normal rate, checks undue and riotous action in the same. (*Radcliffe.*) Lastly, let me say that as a diuretic it is at once the safest and best we possess, and the dose may vary from ten drops to half an ounce. This very day I have given nearly half an ounce, in fifteen-drop doses every two hours, to a child three years old, and by so doing have subdued a rapidly developing general dropsy which was threatening the little sufferer's life.

"P. S.—In some cases of mitral regurgitation accompanied by a loud, dis-

tinct murmur, I have felt that digitalis reduced the intensity of the murmur most decidedly, and in one case it seemed to disappear altogether."

6. *Hypodermic Administration of certain Medicines.*—Mr. CHARLES HUNTER, in a paper read before the Royal Medical and Chirurgical Society (May 23, 1865), brought forward the results of his investigations into the effects of medicines when subcutaneously injected. It is now six years since Mr. Hunter proposed the injection of medicines into the cellular tissue with their general therapeutic object in view. In the case of medicines thus injected for general effects, he called the method the "hypodermic," to distinguish it from the endermic, and from the local injection of Wood. From the endermic method, which term is often and erroneously applied to the hypodermic, it differs much; the endermic is a superficial application, which must be uncertain in its action, which may act powerfully and dangerously, or prove wholly useless. The hypodermic differs from the "method of Wood." The latter plan has for its object the local treatment of a local affection. The injection was supposed by Dr. Wood to be efficacious simply through the localization. Theoretically this method must be limited in its sphere of action to neuralgia or sciatica; to those cases alone accessible to the point of the injecting syringe. Mr. Hunter, in advancing the hypodermic method, maintained that localization of the injection in neuralgic cases was theoretically wrong and practically unnecessary. In 1858 and 1859 he brought forward these propositions in the *Medical Times and Gazette*: 1. That equal effect followed distant and local injections in neuralgic cases. 2. That by distant injections the ill effects of repeated localization were avoided, such as local irritation, thickening of the skin, abscesses, etc. 3. That diseases can be treated with benefit and curatively by this plan, which are neither local nor neuralgic, and which have failed to receive benefit from other modes of medicinal administration. Mr. Hunter is inclined to think that the sickness which used rather frequently to follow the localization of the injection, and which is dreaded as an evil attending subcutaneous puncture, is in part due to the localization of the painful part, as he has hardly found sickness occur at all in his experience of the last few years. In 1859 the first cases were published in the *British Medical Journal*, January 8, 1859, *Medical Times and Gazette*, vol. i., 1859, in which Mr. Hunter proved that diseases affecting the nervous system generally could be treated with benefit by the subcutaneous injection; the cases were serious ones, which had resisted other treatment, and were chiefly cases of insomnia and exhaustion from mania, delirium tremens, tetanus, etc. They exemplified the proposition that "by the introduction of narcotics into the cellular membrane of the body we have a mode of attacking and subduing cerebral excitability more rapid, more certain, and more sure in action than by the stomachic doses of narcotics"¹. Cases of spinal irritability and excitement were then treated, and with benefit, in cases in which stomachic doses had failed to relieve. Instances were given of tetanus, chorea, epilepsy, etc.² The hypodermic method is considered by the author superior to the stomachic, rectal, and endermic modes of medicinal administration, in emergent cases, in which the indications are for anodynes, antispasmodics, hypnotics, and nerve-tonics. And he has found greater and more permanent benefit to accrue from this mode of treatment than from the stomachic use of morphia, atropia, codeia, and other alkaloids. In many diseases there can be no certainty about the stomachic dose. In delirium tremens, for instance, the pill, the draught, or powder, may lie in the stomach undigested; it may be vomited; it may be absorbed, partly or wholly, and, if the latter, so slowly as to do no real good. In the meanwhile the life of the patient is at stake, and death from exhaustion may occur before that sleep which would save the patient can be procured. The investigations of the author led him to believe the hypodermic administration of any alkaloid for the above-mentioned purposes to be more beneficial than the stomachic as regards rapidity of action, certainty of effect, purity of effect, greater permanence of effect, avoidance of exhaustion. 1. *Rapidity of effect.* With morphia sleep can be procured, or delirium quieted, in a few minutes. Atropia will affect the mouth in two or

¹ *Medical Times and Gazette*, March 26, 1859.

² *Op. cit.*, p. 389, etc.

three minutes, and ease the pain of sciatica when injected into the tissue of the arm in five or ten minutes—in less time, in fact, than is usually occupied for absorption into the blood of the remedy from the stomach. 2. *Certainty of effect.* This, as a rule, ought to follow, for the whole amount (when properly and carefully) injected must be all absorbed and circulated. But by the stomach one can only guess at the amount absorbed, and consequently one has often to repeat the dose to approach a certainty of effect. Enormous doses and quantities of opium may lie in the stomach, doing no good in maniacal and other cases, but rather doing harm through the delay their inertness causes, and the uncertainty as to its absorption. In such cases the hypodermic injection of a small dose will often answer at once, while the opium still lies unabsorbed in the stomach. 3. *Purity of effect.* As injected into the cellular tissue, so is the agent absorbed, and its direct and sure effects manifest themselves upon the system. The same agent (*e. g.*, morphia), given by the mouth, will often cause headache, sickness, giddiness, hepatic and bowel constipation, etc. These ill effects, as they do not, as a rule, follow the hypodermic injection, must be due to the different mode of administration; nor need we wonder that a digesting membrane ever being filled with all kinds of pabulum should modify the vegetable alkaloids whilst chemically acting upon other compounds. 4. *Greater permanence of effect.* The author has had various cases of neuralgia and sciatica which for years resisted the internal administration of opium, morphia, belladonna, strychnia, etc., which cases he has cured with the injection of morphia, atropia, strychnia, or some other alkaloid. The cure has no necessary dependence upon the number of injections. One lady who had suffered much from sciatica had no pain for one year after one injection. Another patient has remained free from neuralgia since 1859 after a single injection. In two cases of sciatica, one a hatter, the other a driver to a florist, three or four years have elapsed since they were treated; there has been no relapse in either; both had walked lame and suffered pain for four or five years. The author attributes the greater benefits thus derived partly to the first three advantages that he believes the hypodermic method to possess, and partly also to the slight shock that the diseased nerves sustain through the rapid way in which the alkaloid is brought into contact with them. 5. *Avoidance of exhaustion.* This is an important advantage of the hypodermic method, chiefly due to the rapidity of its action. In the violent spasms of lockjaw, of colic, or even of retention, life may be lost by delay; but even in minor cases, the longer the time that elapses before relief of the spasm or pain is obtained, the greater the subsequent exhaustion. Many hours often elapse before any benefit follows the use of stomachic medication, but by the injection of the cellular tissue the desired relief can be obtained in from five to thirty minutes, instead of after many hours. In the case of delirium tremens the continuous muscular excitement, exhausting in proportion to its activity, is often stopped in a very few minutes, and then sleep follows. The tonic effects of certain medicines are more strikingly manifested by the hypodermic than by other modes of administration. So-called tonics may be thus administered with benefit when they cannot be borne by the mouth. Quinia may, for instance, cause sickness and headache and fail to do good by the mouth, but greatly benefits by the cellular administration. Agents not called tonics may act as such when thus employed, and, when of the class usually called anodynes, may act more tonically than when given by the mouth. In this paper space must limit me to a brief notice of morphia, thus used for its tonic effects. Morphia may be used subcutaneously, not to relieve pain, nor stop spasm, nor as a narcotic; but as a nerve-tonic in cases of great nervous exhaustion, or of irritability or great mental depression; in cases, in fact, in which the brain has been overtaxed, and the mental equilibrium lost, as in some cases of melancholia accompanied by great and unnecessary anxiety, with insomnia. In mania-à-potu and in delirium tremens I have even used the puncture, with morphia, so to steady and quiet the mind and nerves of the patient as to enable him in a few minutes to walk to his office and go through his duties. In the drunkard, as in the overtaxed and melancholic case, there is great mental excitement, and worry,

¹ Paper by M. Desvignes, Med. Chir. Soc. Reports.

and anxiety, and insomnia. The stomachic anodyne will constantly fail to produce any effects; but the hypodermic dose, even where it fails to give sleep, will almost invariably remove the anxiety, the restlessness, and the nervous irritability which are the states leading to exhaustion, and unfitting him for application to work. Thus administered, morphia has nerve-tonic effects, without the disadvantages that so often attend its use when given by the mouth, for it does not interfere with the liver or the bowels, it does not cloud the brain, occasion loss of appetite, nor cause sickness, with the well-regulated dose. In the mentally overtaxed, or the melancholic patient, the night administration will not always cause sleep; it sometimes rather arouses the brain; it may even keep the patient awake, in "a calm state of dreamy dozing," which has the equivalent effect of good sleep the next day; the patient will arise refreshed, mentally stronger, and fit for his day's work. Upon the spinal marrow and its nerves the tonic effects of morphia are more marked when thus administered. The greater permanence of effect when cases have been cured by this plan, and by a comparatively small number of doses, seems to indicate that something more than the mere anodyne influence has been at work. A lady, Mrs. R., was subject to neuralgia in 1859. She had been at times relieved by morphia and opium; she was treated once by the morphia puncture, and has not since had neuralgia. Another patient, Mrs. W. W., was subject to repeated attacks of tic douloureux. The morphia injection cured it last year; she has had no return, notwithstanding a trip to St. Petersburg in bad weather. Sciatica is more than simple pain of the nerve; although of long standing, a single puncture with morphia may relieve all the pain, but the stiffness, the lameness, the deficient nutrition, remain for some time. The repetition of the injection will restore power or tone; and if three or four injections are used where these symptoms remain, in long-standing cases, the patients will often say they feel more power return with each injection. Stomachic doses do not produce these tonic effects so strikingly.—*Med. Times and Gaz.*, June 3, 1865.

7. *A New Method of Applying Electricity to the Body for the Treatment of some Forms of Disease, with a Description of the Apparatus.*—Mr. HARRY LOBB, in a communication to the Royal Medical and Chirurgical Society (March 14, 1865), said that "the present methods of applying electricity to the body are, I consider, in many respects faulty. It has therefore struck me that a better plan might be contrived. It is a desideratum to be able to apply a voltaic current of known intensity persistently and continuously to any part of the body for any desired time. To effect this I have had woven a material of silver wire and cotton in such a manner that either the wire or the cotton can be made to come to the surface. This material can be applied next the skin, and can be made to fit any part of the body, either covering a part or the whole of a limb, or to cover an organ or a small surface. It can be either applied with the metallic surface to the skin or the cotton can be moistened, as it is constructed so as to absorb moisture, and applied to the integument. To the end of the silver wire a covered conducting wire is soldered to the material. The method of application is as follows: The organ, part, or limb is completely covered with the material; the nervous centre supplying the organ, part, or limb with nerves is covered with another portion of the material, each having a separate conducting wire leading from it. These wires are led to a small portable voltaic battery supplying sufficient electricity to penetrate the part, and can be modified according to the amount of surface to be acted upon, according to the nature of the disease, etc. The battery can be arranged for quantity by increasing the amount of surface of the elements, or intensity by increasing the number of the elements. To test the intensity of the battery, a galvanometer may be introduced into the circuit, and when this indicates that the current is passing, the number of elements of the battery should be noted; or a voltmeter may be introduced into the circuit, and when the water is decomposed it shows that there is a current from several more elements in the battery used than is necessary to penetrate the part. The advantages claimed for this arrangement are, that a persistent and continuous current of voltaic electricity, of known quantity and intensity, can be made to pass through any portion of the body for any speci-

fied time; that this current can be applied generally over any large surface, through a limb, or can be localized in any part, organ, surface, etc., however circumscribed; also an interrupted current from an electro-magnetic or magneto-electric battery can be applied by means of this conducting material with the same ease by the surgeon. Thus the current may be applied by the patient at any time during the day or during the night; or without removing the clothes the surgeon may apply any required current to the patient; or a persistent measured current may be caused to pass day and night or for a specified time, the patient carrying about his person a portable battery. The apparatus, woven material, etc., were exhibited and explained."—*Med. Times and Gaz.*, March 25, 1865.

8. *Alkaline and Earthy Sulphites Externally Applied.*—In the November number of the *Annali Universali di Med.*, Dr. GRITTI gives an account of clinical experiments made by him in the Milan Hospital with the alkaline and earthy sulphites externally applied. He employed the sulphite of soda as lotion (ten parts in 100 of water); and also as an ointment, mixed with a glycerole of starch, which he highly praises, as being free from smell and rancidity—820 grammes of pure glycerine are mixed with 100 grammes of sulphite of soda, then are added 80 grammes of starch; the mixture is gently heated in a bath until it becomes of the consistence of a soft paste. This ointment should be spread on the linen at least twenty-four hours before it is used. The chief uses of the sulphites, as used in solution, are—1, diminution of the secretion; 2, diminution and removal of bad odours; 3, rendering viscous and preventing the spread of bad secretions; 4, destroying the elementary constitution of pus; 5, hastening repair; 6, diminishing the sensibility of the surface; 7, hastening cicatrization.—*British Medical Journal*, March 4, 1865.

9. *Medicated Pessaries and Suppositories.*—Professor SIMPSON brought under notice of the Edinburgh Obstetrical Society some changes that have been made in the form and composition of medicated pessaries, and to throw out some suggestions as to the more extended employment in practice of various kinds of suppositories. He had been in the habit for many years past of applying different kinds of medicated pessaries to the cervix uteri in the treatment of uterine disorders; having been led to their use by finding that bromide and iodide of potassium, and many other substances, could thus be administered locally, which were of no avail in the form of a lotion. As a medium for the administration of drugs the ointment-pessary was not new, for Daremberg, in his late translation and commentary of Oribasius, has pointed out that a form of it was made use of long ago in Rome. Pessaries had not yet found an acknowledged place in the Pharmacopœia; but that did not interfere with their usefulness. Up to a recent date, he (Professor Simpson) had been in the habit of using pessaries composed of simple ointment, with the special drug rubbed up in it, made into a globular shape, and stiffened on the surface by being dipped in some warm melted ointment in which the proportion of wax largely predominated. But, latterly, Messrs. Duncan, Flockhart & Co., of this city had made them for him of cocceine, which presented this great advantage over the old ointment, that it was much more consistent and firm when cold, whilst it melted at a lower temperature, and with greater rapidity. In consequence of this greater solidity of the cocceine it was found that pessaries made of that substance were more easily employed by the patients themselves than the softer and more yielding ointment balls; and the facility of introduction was still further promoted by having them made not spherical, but conical, almost precisely of the shape of a Minié bullet.

Professor Simpson had brought with him specimens of some of these pessaries; but their various constitution and uses would be most easily seen by reference to the following list of them, which had been recently published by the chemical firm to which he had alluded:—

Atropine (Belladonna)	Sedative.....	1-20 grain.
Opium	do.	2 grains.
Morphia.....	do.	$\frac{1}{2}$ grain.

Bismuth, Oxide.....	Cicatrizing and Emollient.....	15	grains.
Borax.....	do. do.....	15	do.
Zinc, Oxide.....	do. do.....	15	do.
Tannin.....	Astringent.....	10	do.
Alum.....	do.	15	do.
Alum and Catechu.....	do.	15	do. of each.
Do. Iron.....	do.	10	do.
Acetate of Lead.....	do.	7½	do.
Do. do. and opium....	do.	5	do. 2 grs. opium.
Matico.....	do.	10	do.
Sulphate of Iron (dried).....	do.	10	do.
Gallic Acid.....	do.	10	do.
Perchloride of Iron.....	Hæmostatic.....	5	do.
Persulphate of Iron.....	do.	5	do.
Sulphate of Zinc (dried).....	Caustic.....	10	do.
Carbonate of Soda.....	Antacid.....	15	do.
Carbolate of Lime.....	Deodorant.....	5	do.
Iodide of Lead.....	Alterative and Resolvent....	5	do.
Do. do. and Atropia.....	do. do. ...	5	do. 1-20 Atropia.
Do. Potassium.....	do. do.	10	do.
Bromide of Potassium.....	do. do.	10	do.
Mercurial.....	do. do.	30	do. (<i>Ung. Hydrarg.</i>)

Many of the pessaries are made with morphia ($\frac{1}{2}$, 1, or 2 grains) in them, to suit cases where a sedative is also required. They are also sometimes made hollow in the centre, to allow of a few drops of chloroform liniment being introduced along with them. Various other kinds of pessaries are made.

Besides being useful in the manufacture of pessaries, cocceine would be found invaluable as a medium for the administration of medicinal substances by the rectum. The ordinary suppository mass was apt to be either so soft as to be difficult of introduction through the anus, or so firm in its consistence as to be very slow of solution; and the result in some cases was, that either the medicine was imperfectly applied, or the suppository was so long of dissolving, that the drug had not the opportunity of exerting its specific action at a sufficiently early period. These drawbacks to the use of suppositories was quite done away with when they were made of cocceine, which is at once firm and fusible; and he (Prof. S.) believed that the advantages attached on its use would now probably lead to the more frequent application of medicines through this channel. We had long been in the habit of administering opiates in this way, especially the muriate of morphia in doses varying with each particular case. For many years the suppositories he had most frequently employed contained half a grain of morphia in each; but latterly, for ordinary uses, he had had them made with only a third of a grain, because in a few exceptional cases the half grain exhibited by the rectum seemed to act too powerfully. Dupuytren had pointed out that sometimes opium seemed to affect patients more powerfully when administered per anum, than in the ordinary way; and this case was one of those where the individual appeared to be unusually susceptible of the influence of the dose. But, besides morphia and the opiates, there was a great variety of other remedies that might be usefully applied in this way, as would be seen from this list of suppositories.

Aloine (with Soap).....	1 grain, 5 grains Dry Soap.
Belladonna.....	$\frac{3}{4}$, 1 and 2 grains (<i>Ext. Bellad.</i>).
Bismuth, Oxide.....	10 grains.
Borax.....	5 do.
Copper, Acetate of.....	2 do.
Elaterium.....	$\frac{1}{2}$ grain
Ergot of Rye.....	2 drops Oil.
Gall and Opium.....	5 grains and 1 grain.
Gamboge.....	5 do.
Henbane.....	5 do. (<i>Ext. Hyoscy.</i>).
Iron, Alum.....	3 do.
Do. Persulphate.....	2 do.
Mercurial.....	6 do. (<i>Ung. Hydrarg.</i>).
Morphia.....	$\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{2}$, 1, 1½, and 2 grains.
Opium.....	2 grains.
Podophyllin.....	1 grain.

Santonine.....	5 grains.
Soda, Hyposulphite of.....	5 do.
Tannin.....	5 do.
Zinc, Oxide.....	10 do.
Do. Sulphate (dried).....	3 do.

Thus, there were, first, a number of cathartics which might be introduced into the rectum, and thus often afford relief to patients, without their being subjected to the disagreeable ordeal of swallowing some nauseous medicine. We had all known that nurses were occasionally in the habit of introducing a bit of soap into the bowels of children, with the view of inducing a motion, and the result was thus probably due to the physical irritation that ensued. But the question was, whether we could not introduce some substance into the rectum in the form of a suppository, which would exert such an action on the mucous or muscular coats of the bowel as to lead to a full evacuation. He (Prof. S.) had employed the gamboge suppository in some instances, with a satisfactory result. When introduced into a rectum which was distended with fecal matter, it almost always acted comfortably within an hour; but if introduced into an empty bowel it gave rise to severe griping. He had under his care a lady from Liverpool, who told him the other day with an air of much surprise, that her bowels had acted the night before. She had been habitually constipated, and for many years had had no relief except from the use of an enema, which she used to employ in the morning; and the evening evacuation which had so astonished her resulted from the action of a gamboge suppository which had been introduced. He was not, of course, prepared to say what the precise doses of the different drugs, when thus employed, ought to be; certainly the half-grain of elaterium noted in the list was too large a dose, and in one case had produced some dysenteric symptoms. He sometimes saw, along with Dr. MacLagan, a young lady in whom half a grain of podophyllin in a suppository acted very easily and well; but, in some other patients, the use of a podophyllin suppository had been followed by a very prolonged diarrhœa.

Again, mercury could be administered in the suppository form in cases where it was deemed necessary to salivate, for its specific action was sometimes very rapidly developed when it was thus employed. In this form, moreover, it was one of the most effectual means at our command for the destruction of ascarides; an object which in other instances might probably be attended by the use of suppositories containing santonin or hyposulphite of soda as their active ingredients.

Besides the drugs of the aperient class, we might employ others of a more sedative or tonic character. Thus the acetate-of-copper suppository had been found useful in case of bleeding piles, and he had seen a patient who was suffering from fissure of the anus, and who rebelled against the use of morphia, greatly relieved by employing suppositories containing the dried sulphate of zinc. Ergot might be administered in this manner in appropriate cases; and quinia and iron might be similarly administered—especially with patients whose stomach resented the use of chalybeates. Astringents, too, of every variety, could be employed with the greatest benefit; and, indeed, one could hardly predicate how many kinds of medicines we may yet learn usefully to administer in the form of a simple suppository.—*Edinburgh Medical Journal*, May, 1865.

10. *Basic Nitrate of Bismuth as a Disinfectant*.—This article, when applied to suppurating wounds, is said to remove all odour, and hasten the healing process. It has been employed in scrofulous sores with much success.

11. *A New Soup for Children*. By JUSTUS VON LIEBIG.—For mothers, who have not the good fortune to be able to nurse their own children, or who are deficient in nourishment for their young, the choice of a food suitable for the support of the latter is an object of importance; custom and opinions differ for the most part on the subject, and as the simple laws of nutrition, which should determine this choice are, generally speaking, wholly unknown to the persons to whom the selection must be left, the bodily development of the

children is frequently impaired in earliest infancy by the mode of feeding them (see my *Chemical Letters*, Letter 30, p. 57). It is evident that a child, deprived of its mother's milk without a nurse (the choice of whom is difficult, and is often connected with dangers of another kind), can be properly nourished only when the food given to it has the same nutritive value as woman's milk.

To obtain proper ideas on this subject, it would probably be well to call to mind that milk contains two kinds of matters, which minister to different functions in the system; from the casein in the milk the principal constituent of the blood is formed, and from the latter the principal constituent of the flesh; the butter and the sugar of the milk serve various other purposes in the body, and are used, in their ultimate form, for the development of animal heat.

The food of man and that of animals have a composition similar to that of milk, in so far as they invariably consist of a mixture of two kinds of matters, of which one fulfils the same office as the casein, while the other supplies the place of the fat and of the sugar of milk; the formation of blood or flesh, and the temperature of the body being thus maintained through the food.

The seeds of the cerealia contain a substance identical with coagulated casein, the seeds of the leguminosæ, peas, and beans contain a matter identical with the cheese as it exists in milk. It is true that the flour of the cerealia contains no sugar of milk and but little fat, but it is rich in starch, which in the stomach is converted into sugar.

For the normal maintenance of the vital process the relative proportion of blood and warmth-creating matters in the food of the animal is not indifferent; in order to increase in his bodily weight, or to grow, the individual needs not only an increasing mass of food, but a varying proportion of blood and warmth-creating constituents in the food.

It is the great merit of Haubner, that he was the first to obtain practical recognition among agriculturists of the importance of the correct proportion between both classes of substances in the feeding of animals, to which I directed attention in my *Chemical Letters*, and through the admirable investigations of Henneberg, Stohmann, Lehmann, Knop, Arendt, Bähr, Pincus, and others, connected therewith, the principles of a theory of feeding have now been obtained, by which the agriculturist or the producer of meat and milk is enabled so to replace the milk in the feeding of the calf, or the hay, the universal food which nature presents to the herbivora, by the admixture of such food at his command, as turnips, oat and rye straw, potatoes, rape-cake, pea-meal, &c., that the latter produce a nutritive effect equivalent to that of milk or hay.

The investigations just alluded to have shown that if the flesh and warmth-creating nutriments, corresponding to the age and wants of the individual, are given in the correct proportion, both produce a maximum of nutritive effect.

A deficiency of warmth-creating constituents may be replaced by an excess of blood-creating matters, but this excess then loses its power to increase the weight of the body. The warmth-creating matters are incapable of producing blood; an excess beyond the proper proportion loses its efficiency.

In this it is assumed that as much food be given to the individual as he has inclination or appetite to eat.

If we suppose that a boy, for the simple maintenance of his bodily weight, needs half an ounce of blood-and-flesh-forming aliment, this will be obtained in potato diet, if the boy is able daily to consume twenty-four ounces of steamed potatoes, for the increase of his muscular substance a greater quantity must be used.

Potatoes contain for one part by weight of blood-forming substance, 9 to 10, say ten parts of warmth-producing matter (starch). In 24 ounces of steamed potatoes there are 5 ounces of starch, of which only $2\frac{1}{2}$ ounces are used in the body for the production of heat; the balance of $2\frac{1}{2}$ ounces passes off by the bowels unused.

In five ounces of peas we have one ounce of blood-forming substance (consequently as much as in 48 ounces of steamed potatoes) and $2\frac{1}{2}$ ounces of starch. It is evident that if we make a mixture of 12 ounces of steamed potatoes, and of peas-porridge prepared from $2\frac{1}{2}$ ounces of peas, we have in it:—

	Blood-forming substance.	Warmth-producing substance.
12 ounces of potatoes contain	0.250	2.50 ounces.
2½ “ peas “	0.500	1.25 “
14½	Total 0.750	3.75 ounces.

or the proportion of 1 : 5 corresponding to the wants of the body of the boy. The boy will not only more easily assimilate this mixture of 14½ ounces of peas-porridge and potatoes than the above 24 ounces of potatoes alone, which have only imperfectly nourished him, but he will also in this less weight of food appropriate one-fourth more of blood-forming aliments—an excess which is necessary for his growth—that is, to increase his bodily weight.

This example may exhibit the principles which have guided me in the preparation of a food for nurselings : as I have mentioned, they have been verified in a remarkable manner in the feeding of cattle, in the production of flesh and milk.

The composition of milk is not constant ; its amount of casein, sugar-of-milk, and butter, varies with the food with which the individual is nourished. According to the analyses of Haidlen, the milk of a healthy woman contains in 100 parts 3.1 of casein, 4.3 of sugar-of-milk, and 3.1 of butter ; woman’s milk is in general poorer in casein than cow’s milk.

If we assume that 10 parts of butter produce in the animal body the same warmth-creating effect as 24 parts of starch, and likewise 18 parts of sugar-of-milk that of 16 parts of starch, we can by the aid of these numbers compare the nutritive value of milk with that of the flour of the cerealia, if we express butter and sugar-of-milk in their equivalents of starch.

In this manner we find that there are contained :—

	Blood-forming matters.	Warmth-producing matters.
In woman’s milk	1	3.8
“ cow’s milk, fresh	1	3
“ “ “ skimmed	1	2.5
“ wheaten meal	1	5

Woman’s milk is poorer in salts than cow’s milk ; but it has a stronger alkaline reaction, and contains more free alkali, which *in the different sorts of milk is potash.*

It is evident that we can easily calculate a mixture of milk and flour (a milk-pap), which shall contain precisely the same proportions of blood and warmth-producing aliments as woman’s milk (namely, 1 : 3.8) ; but this mixture could not in other respects replace woman’s milk, as wheaten flour has an acid reaction, and contains much less alkali than woman’s milk, and (as we must suppose), than is required for normal blood-formation. Moreover, even if starch is not unfitted for the nourishment of the child, by its conversion into sugar during the process of gastric digestion, an unnecessary labour is imposed upon the system, which the latter is spared, if we first convert the starch into the soluble forms of sugar and dextrin. This can easily be done by adding to wheaten flour a certain quantity of malt flour. If we boil milk with wheaten flour to a thick pap, and add to the latter a certain amount of malt flour, the mixture after a few minutes becomes fluid, and acquires a sweet taste.

On this conversion of the starch into sugar, and on supplementing the alkali in the milk, depends the formation of the new soup, which I shall now describe.

The skimmed cow’s milk usually sold seldom contains more than 11 per cent. of solid combustible matters (4 casein, 4.5 sugar, 2.5 butter) ; 10 parts of cow’s milk, 1 part of wheaten flour, and 1 part of malt flour, afford a mixture which possesses very nearly the nutritive value of woman’s milk :—

	Blood forming constituents.	Warmth-producing constituents.
10 parts of cow’s milk contain	0.4	1.00
1 part of wheaten flour contains	0.14	0.74
1 part of malt flour contains	0.07	0.58
	0.61	2.32
	= 1	3.8

The malt flour contains 11 per cent. of blood-forming matter, of which, however, only seven parts enter into the soup.

As wheaten flour and malt flour contain very much less alkali than woman's milk, this must be supplied in the preparation of the soup. I have found that the addition of $7\frac{1}{4}$ grains of bicarbonata of potash, or of 3 grammes or 45 grains of a solution of carbonate of potash, containing 11 per cent. of the salt, suffices to neutralize the acid reaction of both kinds of flour.

In the preparation of the soup we proceed as follows: One part by weight (half an ounce) of wheaten meal is placed in the little vessel intended for making the soup, to this the milk is gradually added in small portions with constant stirring, the conglomeration of the meal into lumps being carefully avoided; this mixture is heated with diligent stirring to the boiling point, at which it is kept for three or four minutes, and is then removed from the fire.

One part (half an ounce) of malt flour is now weighed, carefully mixed with 45 grains of the solution of carbonate of potash just mentioned, and with two parts by weight of water, and this mixture is now added with constant stirring to the milk-pap; the vessel is then covered to avoid cooling, and is allowed to stand for half an hour.

It is advisable, after the addition of the malt flour, to place the vessel in hot, nearly boiling water, so that the mixture may the longer keep warm; it thus becomes thinner and sweeter. After this time the whole is placed once more on the fire, is allowed to boil again, and the soup is then passed through a fine wire or hair-sieve, which retains the bran of the malt flour.

Those who are acquainted with the mashing process need not be reminded that after the addition of the malt the temperature should not exceed 151° F. The above directions are so calculated that, including the time used in weighing and mixing the water with the malt flour, we have, after the addition of the latter to the hot milk-pap, a mixture of the temperature of 151° F.

The following process is simpler, and, as cooks maintain, more convenient than that just described:—

Half an ounce of wheaten meal, half an ounce of malt flour, and seven and a half grains of bicarbonate of potash, are weighed, mixed first with one another, and afterwards with an ounce of water, and lastly with five ounces of milk; the mixture is then heated with constant stirring, over a very gentle fire, until it begins to grow thickish; the vessel is now removed from the fire, and its contents are stirred for five minutes; these are then heated once more and again removed, when a new thickening occurs; lastly, the whole is brought to a boil. After the separation of the bran from the milk through a fine sieve the soup is ready for use.

Wheaten Meal.—For this ordinary new meal is chosen, not the finest or the first shot meal, which is richer in starch than the whole meal.

Malt.—Barley malt can easily be procured from any brewer. In Germany, or rather in Munich, the malt is so much dried that the starch of many grains appears to be half-roasted. This malt employed in making the soup gives to the latter a taste of bread, which is not unpleasant; usually the malt contains an admixture of many seeds of weeds, which must be picked out with the hand. An ordinary coffee-mill answers for preparing the malt flour, the latter must likewise be separated by means of a hair-sieve, not too fine, from the chaff. Malt prepared from barley is to be preferred to that from oats, wheat, or rye.

Carbonate of Potash.—For the preparation of the solution the ordinary kali salt, carbonas depurata of the pharmacies, answers very well; two ounces of the salt are dissolved in sixteen of water. If spring water be used, there is generally a precipitate of some carbonate of lime; after an hour the fluid becomes quite clear and bright. The carbonate of potash must not be greasy or damp. The bicarbonate of potash is the ordinary crystallized salt.

Note.—In order to avoid the rather troublesome weighing of the flour, we may observe that a heaped tablespoonful of wheaten meal weighs nearly exactly half an ounce; a heaped tablespoonful of malt flour, wiped off at one-half with a card, likewise weighs half an ounce.

For measuring the solution of potash an ordinary thimble answers; this when

filled holds nearly three grammes (45 grains, 2.8 cubic centimetres) of the solution of potash.

For the milk and the water two ounces are weighed in an ordinary tumbler, then five ounces of water, and the heights at which both quantities of fluid stand are marked on the outside of the glass by attaching pieces of paper.

When the soup is properly prepared it is sweet as milk, and the further addition of sugar is unnecessary; it possesses double the concentration of woman's milk, and can, which is not unimportant for sucklings, be given in the nursing bottle. If it has been heated to the boiling point, it keeps good for twenty-four hours; if this has not been done it turns sour and coagulates like milk; if the addition of potash be neglected, it cannot, in general, be heated to the boiling point without coagulating. In the absence of the potash the soup is difficult of digestion like ordinary milk-pap.

I was first led to prepare this soup by the facts that one of my grandchildren could not be nursed by its mother, and that a second needed a more concentrated food in addition to its mother's milk; the fathers of both children are physicians, who are well able to judge of the effects of the soup. It has proved both in my own family and in other families where it has been introduced, to be an excellent food, and I myself often use it; in coffee it supplies the place of tolerably good cream.

The soup has a slightly mealy or malty taste, to which children soon become so accustomed that they prefer this food to any other. A physician of this place, Dr. Vogel, who has an extensive practice among children, tried to introduce this soup into the families of poor people; in general it did not find acceptance with them, because the thick milk-pap lost its consistence on the addition of the malt, and became thin. The people imagined that its nutritious quality was connected with the thickness of the pap, and was diminished by the malt.—*Medical Press*, May 17, 1865, from *Annalen der Chemie und Pharmacie*.

[We have used this children's food, prepared according to the directions of Prof. Liebig, and have found it to be a most light, easily digestible, and nutritious article of food.]

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

12. *On the Cerebro-Spinal Symptoms and Lesions of Typhus Fever, and on the Relations of Typhus to Epidemic Cerebro-Spinal Symptoms*.—Dr. CHARLES MURCHISON, the physician to the London Fever Hospital, whose great experience in various forms of fever, and acknowledged acumen and mature judgment, entitle his opinions to respectful consideration, has presented (*Lancet*, April 22, 1865) the following as the conclusion at which he has arrived in regard to the identity of typhus fever and cerebro-spinal meningitis.

"It is well known," he says, "that among the phenomena of typhus the cerebro-spinal symptoms hold a very prominent place. First, there is headache with vertigo and injected conjunctivæ; then come restlessness, sleeplessness, and delirium, followed by stupor or coma. With these symptoms may be associated paralysis of the sphincters or of the detrusor muscle of the bladder, hyperæsthesia, tremors, floccitatio, subsultus or general convulsions, strabismus, tetanic rigidity of the muscles of the limbs, or even opisthotonos. Occasionally typhus commences with violent delirium and other cerebral symptoms, so that more than once I have known it mistaken for acute mania. The disease, in fact, is the *typhus comatosus* of Sauvages—the *brain fever* of many practitioners. Similar symptoms are sometimes, though more rarely, met with in the course of enteric fever, and have lately been made the subject of a separate monograph by Dr. Fritz.¹

¹ *Étude Clinique sur divers Symptômes Spinaux observés dans la Fièvre Typhoïde*. Paris, 1864.

"Among the most common anatomical lesions of typhus are engorgement of the venous sinuses of the dura mater, increased vascularity of the pia mater, and an accumulation of serous fluid in the ventricles and in the subarachnoid space of the brain and cord.

"It is not many years since these symptoms and lesions were believed to be the result of inflammatory action in the membranes of the brain and cord, and the treatment of typhus was based upon this belief. But the researches of John Reid and of all subsequent observers have demonstrated that there exists no relation whatever between the degree of vascularity and the amount of subarachnoid fluid on the one hand, and the severity of the cerebral symptoms during life on the other; while it is now universally admitted among pathologists that the lesions of typhus are quite independent of inflammatory action. This is the result of my own observations; and the investigations of John Reid, Peacock, Jenner, Jacquot, Barrallier, and of all modern observers who have had much experience in the *post-mortem* examination of typhus, lead to the same conclusion. M. Moering, of the Russian army, examined the cerebral membranes and subarachnoid serosity in upwards of two hundred cases of typhus, but in no instance could he detect a single pus or exudation corpuscle.¹ The brain in typhus becomes atrophied from want of proper nutrition, and the fluid appears to be effused to fill up space. It has been well observed, that those symptoms which indicate inflammation of the brain under ordinary circumstances, do not indicate inflammation when the case is one of typhus fever. Still, it is not surprising that many modern practitioners, having little experience in *post-mortem* examinations, regard the cerebral symptoms and lesions of typhus as due to inflammation, and that when the disease shows itself in countries where it is little known this should be the common opinion.

"But to the rule above laid down there are exceptions. In rare cases, typhus fever is complicated with unmistakable inflammation of the membranes of the brain. At the time of publication of my work on fevers I was under the impression that this complication never occurred, but subsequent experience has convinced me that I was mistaken. In the interval I have met with two unequivocal cases of typhus complicated with true meningitis and the effusion of lymph on the surface of the brain. One case was that of an infant aged seven months, admitted with his mother into the London Fever Hospital. Both mother and child had a characteristic typhus rash. The infant was feverish and very restless, moved his head constantly from side to side, and died about the fifth or sixth day of his illness, death being preceded by a severe attack of convulsions. After death the pia mater was found to be intensely injected, and there was a quantity of solid lymph plastered over the base of the brain. The second case was that of a girl aged nineteen, who had previously enjoyed good health. During the first night of her illness she was delirious; in the second night she had acute delirium, followed next day by coma. On the fourth day of her illness an eruption of typhus appeared on the chest and abdomen, and rapidly became petechial. On the following morning, at three A. M., the patient died comatose. On examining the body, the petechiæ on the skin were found to be persistent. There was intense injection of the pia mater and of the brain-substance. The white matter presented a pinkish tint, and the gray matter a dark chocolate hue. Large patches of soft, opaque, yellow lymph were found on the surface of the hemispheres following the course of the veins. There was no lymph at the base, and no subarachnoid serosity. Each of the lateral ventricles contained about half a drachm of turbid fluid. In a third case, a girl aged five, admitted into the London Fever Hospital, typhus proved fatal about the fifteenth day from tubercular meningitis; but in the two first-mentioned cases no trace of tubercle could be discovered either in the membranes of the brain or in the lungs. In an epidemic of typhus in 1831, several cases were observed by Dr. Roupell, in the Seamen's Hospital, in which lymph or pus was found deposited beneath the arachnoid.² Some of these cases were dissected by Mr. George Busk, F. R. S., who, I find, corroborates Dr. Roupell's description. A case of typhus compli-

¹ Jacquot, Du Typhus de l'Armée d'Orient, 1858, p. 244.

² Roupell on Typhus Fever, 1839, pp. 108, 217.

cated with true meningitis is reported by Jacquot.¹ Louis also records two cases of enteric fever in which the signs of recent meningitis were found after death.²

"The above remarks appear to me to be not altogether irrelevant to the subject of what is called 'epidemic cerebro-spinal meningitis,' about which much has been said in connection with the epidemic now prevailing in Russia and Germany. The accounts of this epidemic make it clear that it consists for the most part of relapsing fever and typhus, and that in this respect it resembles the Irish epidemic of 1847. One of the diseases composing it, however, has been described as cerebro-spinal meningitis—a true inflammation of the pia mater accompanied by the effusion of lymph or pus, attacking chiefly young children, and 'decidedly infectious.' This malady has been spoken of as prevailing at St. Petersburg, but more especially at Dantzic, on the Polish frontier of Prussia, and in Brunswick, Hesse, and Hanover.

"Epidemic cerebro-spinal meningitis is said to have been first accurately observed at Geneva in 1805, and since then epidemics of it are recorded as occurring in France, Italy, Norway, Denmark, Ireland, and America. For a full account of all these epidemics I must refer to the elaborate works of Boudin³ and Hirsch.⁴

"It is possible that some of these epidemics were really examples of primary inflammation of the cerebral and spinal membranes; but when this seemed to be the case, it is to be noted that the persons attacked were comparatively few, that no eruption appeared on the skin, and that there was no evidence of the disease being infectious. I would instance in particular the epidemic described by Dr. Mayne, as attacking children in several of the Irish workhouses in 1846, with regard to which the absence was noted 'of any proof that it has ever been propagated by contagion.'⁵ But most of the epidemics, it is to be observed, occurred under precisely the same circumstances as those in which typhus appears—that is to say, they occurred in overcrowded and badly ventilated barracks, prisons, and workhouses, and among the poorest of the civil population living in overcrowded houses and narrow courts.⁶ Speaking of the French epidemics, M. Corbin⁷ says: 'La cause principale à nos yeux (et en cela nous sommes d'accord avec M. Tourdes, avec M. Gasté, et avec la plupart des médecins militaires), c'est l'encombrement.' Speaking of the epidemic in Italy, M. Devilliers writes: 'Elle atteignait des populations pauvres, entassées quelquefois pendant l'hiver pêle-mêle avec les bestiaux.' Like typhus, the disease has been most prevalent in winter and spring, and, like typhus, it has been propagated by contagion. It is true that some writers have doubted its contagious character, just as some observers have denied that typhus is contagious; but the fact that the disease has in many instances been transported by certain French regiments from one locality to another,⁸ in my opinion settles the question.⁹

"The American epidemics of cerebro-spinal meningitis, which have been regarded as the precise counterpart of those observed in Europe, may be selected for more detailed investigation; and, in the first place, it is a significant fact that in America 'epidemic cerebro-spinal meningitis' has long been known by the designation 'spotted fever.' At the present time both terms are applied indiscriminately to the same disease. Among its chief symptoms are: rigors, headache, and vomiting, succeeded by acute delirium, and afterwards by coma, and in some cases by convulsions or tetanic rigidity of the muscles; a dry brown

¹ Jacquot, op. cit., p. 228.

² Louis, *La Fièvre Typhoïde* (Obs. 17 and 25).

³ Boudin, *Traité de Géographie Médicale*.

⁴ Hirsch, *Handbuch der Historisch-geograph. Pathologie*. Zweiter Bd., s. 624.

⁵ Dub. Quar. Journ. of Med. Sci., July, 1846, p. 95.

⁶ Hirsch, op. cit., p. 651.

⁷ *Gaz. Méd. de Paris*, 1848, p. 444.

⁸ Hirsch, op. cit., p. 650.

⁹ "Serait il permis à votre rapporteur d'émettre ici, sous sa responsabilité, l'opinion que la maladie appelée méningite cérébro-spinale, ne serait que la forme nerveuse, ataxique, tétanique du typhus lui même."—Gaultier de Claubry, *Rapport sur les Epidémies qui ont régné en France de 1841 à 1846*. *Mém. de l'Acad. de Méd.*, xiv. 158.

tongue; injected conjunctivæ; albuminous urine, and an eruption upon the skin rapidly becoming petechial. The principal *post-mortem* appearances are: increased vascularity of the meninges of the brain and cord; an effusion of serum beneath the arachnoid and into the ventricles; occasionally lymph or pus beneath the arachnoid; hypostatic congestion of the lungs; enlargement of the spleen; a fluid condition of the blood, and extravasations of blood in various parts of the body. Two of these characters require especial notice—viz., the eruption, and the lesions of the cerebro-spinal membranes. One writer describes the eruption as sometimes ‘like measles;’¹ a second, as ‘not unlike the spots seen in enteric and typhus fever,’ and as sometimes presenting ‘all grades from the rose-coloured rash to the deep and permanent petechiæ;’² while a third writes of them thus: ‘The more recent and smaller ones disappeared on pressure, while the larger ones were ecchymotic in character. The larger ones were dark in their centres, and of a light red along their margins. Their form was exceedingly irregular; they were notched and irregular in outline, and either angular or nearly rounded, none having any definite oval form.’³ Lastly, Dr. Upham, in one of the ablest memoirs on the subject, observes: ‘Petechiæ were not an unfrequent manifestation—in appearance almost identical with the true typhus eruption, and, like that, seen upon every part of the body except the face—persistent on pressure, varying in hue from the darkest aspect of measles to that of the true petechial spots imbedded in the skin.’⁴ No better description could be given of the eruption of typhus. With regard to the cerebral lesions, it is to be noted that though, as in typhus, lymph and pus were found in some cases, in many the effusion was simple serum, while in others the brain and membranes were perfectly healthy; so that, according to a late writer, ‘the conclusion is irresistible that the disease consists of a pathological condition of the system at large, whereof the various local lesions are but the accidental complications.’⁵ If to the above characters be added the facts that its contagiousness is a disputed question, and that it has been found to prevail chiefly under circumstances of overcrowding and inadequate ventilation,⁶ it cannot be surprising that many American physicians admit the close relation of cerebro-spinal meningitis to typhus, while some maintain the identity of the two diseases.⁷ It may be well, therefore, to consider the four points of distinction between them laid down by one of the latest writers on the subject, Dr. Lidell,⁸ and in doing so I adopt the writer’s own words.

“1. ‘Spotted fever often runs its course in a few hours; typhus requires at least several days.’ The rapid course of many of the American cases, and of epidemic cerebro-spinal meningitis generally, is no doubt remarkable, but is not sufficient to found a distinction, for many cases of typhus are on record where the disease has terminated fatally on the second or third day, or even after a few hours. Such were the cases of *typhus siderans*, or *blasting typhus*, which devastated the garrisons of Saragossa, Torgau, Wilna, and Mayence during the wars of the first Napoleon. Similar cases were observed in Ireland during the epidemic of 1847–48, and amongst the French troops in the Crimea in 1856.⁹

“2. ‘Spotted fever is frequently attended with convulsive movements; typhus is never so accompanied.’ My experience of typhus is precisely the reverse. Convulsive movements are not uncommon. During the last three years upwards of forty cases of typhus complicated with general convulsions have been observed at the London Fever Hospital,¹⁰ and in several instances I have noted

¹ Report on Spotted Fever in New England, p. 131. 1810.

² Woodward, American Medical Times, May 14, 1864, p. 232.

³ Clark, *ib.*, p. 236.

⁴ Hospital Notes and Memoranda on Epidemic Cerebro-Spinal Meningitis. Boston, 1863.

⁵ American Journal of the Medical Sciences, Jan. 1865, p. 27. See also *ib.*, July, 1864, pp. 138–140.

⁶ *Vide* Upham, *op. cit.*, p. 28.

⁷ American Medical Times, May, 1864, p. 237; and Upham, *op. cit.*, p. 37.

⁸ American Journal of the Medical Sciences, Jan. 1865, p. 26.

⁹ For references to these epidemics, see my work on Fevers, p. 179.

¹⁰ *ib.*, p. 160.

strabismus, tetanic contractions of the muscles of the limbs, and even opisthotonos.

"3. 'Spotted fever patients often die very suddenly and unexpectedly of coma and asphyxia; typhus patients do not die in this way.' According to my experience of typhus, the most common mode of death from the primary fever is by a combination in various proportions of syncope and coma. A large proportion, also, of fatal typhus cases are complicated with pulmonary disease, and then death occurs by coma and asphyxia. Moreover, I have repeatedly known patients who appeared to be going on well become suddenly comatose, and die in a few hours.

"4. 'The eruption in spotted fever frequently appears on the first day; while in typhus the eruption does not appear till the end of a week or more.' According to my experience, the eruption of typhus usually appears on the third or fourth day, is rarely delayed beyond the sixth day, and may sometimes be noted on the second day. It is well known, also, that in severe cases of most blood diseases petechiæ may appear as early as the first day. The sooner the eruption of variola appears the more grave is the case.

"These considerations seem to justify the opinion that the grounds for drawing a specific distinction between the epidemic cerebro-spinal meningitis or spotted fever of America and typhus fever are most inconclusive, and particularly when it is recollected that typhus fever running the ordinary course has been prevailing in many parts of America since the commencement of the present war. I agree entirely with the opinion expressed by Dr. Upham. 'The disease,' he says, 'seemed to me rather to partake of the nature of typhus, in a severe and malignant form, identical in its essential elements with the typhus fever of Great Britain, which, under the names of maculated typhus, ship fever, camp or jail fever, has many times been observed in this country—having, in this instance, a special direction to the meninges of the brain and spinal cord.' And if we study the account of the epidemic cerebro-spinal meningitis which is said to prevail at present in Russia and Germany by the light of the American descriptions, we are forced, I think, to a similar conclusion. It is needless to recapitulate the symptoms of this epidemic, for they are almost identical with those observed in America, including an eruption which sometimes resembles that of measles. But if we bear in mind, further, that this Russian cerebro-spinal meningitis is said to be 'decidedly infectious,' that its prevalence is favoured by overcrowding and bad ventilation, and that there is a concurrent epidemic of undoubted typhus, it seems probable that the infectious cerebro-spinal meningitis of Russia and Germany is merely typhus running a rapid course, with severe cerebral symptoms, and sometimes with actual meningitis, as in the cases observed at the London Fever Hospital. At all events, the possibility of such being the case must not be lost sight of.

"It would be a fit subject for inquiry if any relation exists between the frequency of convulsions in the typhus of Russia and the use of bread containing spurred rye. A disease, termed 'convulsive ergotism,' distinguished by the characters of an acute comatose affection—giddiness, dimness of vision, insensibility, convulsions, imperceptible pulse, and death within two days—is said to prevail in the epidemic form in various parts of the continent where rye constitutes a considerable proportion of the food of man.¹ There is, however, no evidence or probability that this disease is infectious.

"In conclusion, I would only observe that, before attempting to establish a new specific disease, it is necessary to keep in view the many modifications which those already known to us may undergo; and more particularly to study their etiological relations, and the circumstances under which they arise and are propagated."

13. *Different Spinal Symptoms observed in Typhoid Fever.*—The occurrence during late years of an epidemic disease, termed by some cerebro-spinal meningitis, by others spotted fever, and in many instances its prevalence simultaneously with typhoid and typhus fever has led to a discussion in regard to the relation-

¹ Vide Christison, Treatise on Poisons, p. 668. 1829.

ship of these affections. Dr. Murchison maintains that the epidemics of cerebro-spinal meningitis, which have prevailed in this country, and are now prevailing in Germany and Russia, are really epidemics of typhus.

Dr. E. FRITZ, in a work recently published,¹ endeavours to prove that spinal symptoms in typhoid fever have been too much viewed as accidental complications. This work has not yet reached us, but we take from a contemporary² the following translation of its concluding portion:—

“It follows (he says) from the facts which we have stated, that the spinal cord is more or less subject to disturbance in a large number of instances of those attacked with typhoid fever, and at different stages of the disease.

“In its prodroma, and at the beginning of the first week, the spinal symptoms are seen to be light, and yet are easily observed in more than a moiety of the cases.

“These symptoms are lumbar pains, in all respects like those which so often commence an attack of variola, occasionally, as in that malady, accompanied by a partial paralysis of the lower extremities, or more frequently by cutaneous and muscular hyperæsthesia; painful shootings in the limbs; rachialgic pains more or less intense in the dorsal region; a pain, often severe, in the back of the neck, radiating to the occiput, interfering with the motions of the head and neck, and sometimes attended by pains of the inferior extremities and a feeling of stiffness of muscles; lastly, great sensibility (spinal hyperæsthesia) from pressure on the spinal apophyses in the aching parts.

“These symptoms are not more inconstant than the majority of those which form a part of the general description which is commonly given of typhoid fever; it is right, then, that they should not be omitted.

“They usually continue to the middle or end of the first week, when they disappear; as likewise, in a large number of cases, the cerebral symptoms, which at first occurred, now cease, or a little later.

“But it is not always thus: the spinal symptoms, as well as those of cerebral disturbance, may attain even from the incipient attack an unusual intensity, then increase in number, be variously associated, and take a more decided rank in the total of the phenomena, and persist to an advanced stage of the disease.

“From the most simple to the most complicated cases, there is in relation to these symptoms a series of insensible transitions, and it results from the autopsies which have been made, and from the clinical analysis, that even in the cases in which the spinal symptoms have attained an unusual violence, no proof is afforded of the presence of myelitis or of spinal meningitis accidentally complicating the fever. At most, only in a very limited number of instances can the spinous symptoms be referred with any strictness to a congestion of the membranes of the spinal cord.

“It may be affirmed, too, that most commonly the spinal cord and its membranes are not the seat of any appreciable material lesion.

“The symptoms in question are not accidental complications, more than the cerebral symptoms are in those cases in which they acquire an exceptional intensity; consequently, if we allow of a cerebral variety or form of typhoid fever, we should, to include the class of symptoms above described, accept a spinal variety, thereby indicating a predominance of spinal symptoms. These symptoms are not the only ones which belong to the spinal varieties of this fever.

“The phenomenal tableau of these varieties comprehend almost entirely the semeiotic of the spinal cord.

“Amongst the alterations of sensibility, first should be mentioned cutaneous hyperæsthesia, extending over a considerable portion of the body, sometimes to the four extremities, and to the trunk and neck, accompanied often with muscular hyperæsthesia; next, spinal hyperæsthesia, reaching from the atlas even to the sacrum; then, in decreasing frequency, rachialgia, with painful radiation to different parts of the body, insupportable pains in the lower extremities, rarely in the superior; violent pains in the chest; pains in the waist; neuralgic pains,

¹ *Etude Clinique sur divers Symptomes Spinaux observés dans la Fièvre Typhoïde.* Par Dr. E. Fritz, Lauréat (Médaille d'Or), &c. Paris, 1864.

² *British and Foreign Medico-Chirurgical Review.* April, 1865.

bilateral and symmetrical; abnormal sensations of cold, formications; a sense of pricking along the vertebral column, and in the members; cutaneous analgesia, and anæsthesia; muscular anæsthesia.

"The derangements of the motor functions of the cord are not less various: paralytic symptoms, numbness of the extremities, paraplegia, partial paralysis of the respiratory muscles, constipation, retention of urine, paralysis of sphincters, spasmodic symptoms, spasmodic dysuria, spasmodic or convulsive contractions of the respiratory muscles, or of the muscles of the extremities, rigidity of the muscles of the neck, contractions of the extremities.

"Here, perhaps, might be introduced with propriety symptoms of a tetanic kind.

"To this sketch it is proper to add a special group of symptoms originating in the medulla oblongata, such as extreme dyspnœa, independent of any affection of the voice or of the respiratory muscles, spasm of the pharynx and larynx, convulsive cough, aphonia, alalia, masticatory glossoplegia, spasmodic or rhythmic contraction of the sterno-mastoideus and trapezius muscles, paralysis of the pharynx.

"The spinal varieties of typhoid fever are rarely unmixed; they are often enough accompanied by cerebral, thoracic, or other phenomena of great intensity.

"Of these complications, as regards diagnosis, the most important is the coincidence of the spinal form with grave cerebral symptoms (the cerebro-spinal variety of M. Wunderlich). It is amongst infants and young women, and individuals labouring under anæmia, that the spinal cord appears to be more especially affected in typhoid fever.

"The spinal varieties of the disease have generally been observed, but not always under these conditions. It does not appear that hysteria conduces to them.

"The spinal symptoms are of irregular occurrence; at times, they are rarely witnessed; at other times they are frequent, and of great intensity.

"The severe spinal and cerebral forms are more prevalent when the disease is epidemic than when sporadic.

"The study of the symptoms of the spinal varieties of typhoid fever is of the highest importance in relation to diagnosis. Owing to a want of knowledge of these deceptive varieties, typhoid fever has not unfrequently been mistaken for spinal and cerebro-spinal meningitis, and this even by individuals of much experience in clinical practice.

"Such an error may almost always be avoided by marking the absence of harmony in the different functions of the cord; the integrity of some of these functions contrasted with the profound perversion of others; the mobility of symptoms, their irregular succession; the expression of the face, the nature of the delirium, epistaxis, gastric troubles, iliac pains, diarrhœa; the outbreak of lenticular rose-spots, sibilant râles.

"The spinal symptoms of moderate intensity nowise seem to differentiate typhoid fever from various acute maladies, which may simulate it at the beginning.

"The prognosis of the spinal forms, and especially of the cerebro-spinal, is almost always serious, and most of all in adults. The mortality of these cases is great, the duration is generally long, and paralytic or other accidents are not uncommon sequences.

"Symptoms implicating the medulla oblongata always require a very guarded prognosis; and dyspnœa, with extreme depression at the beginning, without pulmonary complication, denote almost always a speedy and fatal termination.

"The spinal symptoms of typhoid fever never, *per se*, require bloodletting: the contrary is mostly indicated. When the symptoms are threatening, dry cupping or scarifying should be applied along the course of the spine, with cutaneous revulsives, stimulating baths, cold lotions, and repeated purgatives.

"Belladonna given internally may, perhaps, be useful, whilst all the preparations of opium appear to be contra-indicated.

"Lastly, as palliatives, topical emollients and anodynes may be of some service."

14. *Epidemic Cerebro-spinal Meningitis in Germany.*—In the fifth number of the *Archiv der Heilkunde*, for 1864, Professor WUNDERLICH gives an account of nine cases of this affection which fell under his notice in the spring and summer of last year. The following abstract of the author's summary cannot fail to interest those of our readers who witnessed the ravages of the recent epidemic in this country.

No cause could be assigned for the disease, which seemed to select for its victims the young and robust. There was not the slightest evidence of its contagiousness.

Sometimes the onset was sudden; sometimes premonitory symptoms were observed, but they passed very rapidly into the fully developed attack. Its phenomena were of the most frightful character, more so, indeed, than belong to any other epidemic disease.

The nervous phenomena were various, and indicated that, although their origin was in the cerebro-spinal axis, yet the share of different portions of the nervous centres in producing them must be different. Thus, while in seven cases the phenomena were cerebral, as very severe headache, delirium, sopor, and deafness, in the remaining two cases they were spinal, as excessive pain in various parts, or paralysis. Hence it may be inferred that sometimes the membranes, and sometimes, again, the medullary substance, are involved. It is also noteworthy that, unlike other forms of meningitis, this one did not present constant alterations of the pupils nor spasms of the facial muscles, and that, in spite of the spinal exudation, paraplegia was only once observed.

The number and severity of the symptoms did not always correspond to the degree and extent of the anatomical lesions, as, indeed, is generally the case in epidemic (infectious) diseases. As just stated, paraplegia occurred only once, and in another case with very profuse exudation, extending as low as the cauda equina, there was no paralysis.

However various and diverse the nervous phenomena might be, there was invariably opisthotonic retraction of the head, contraction and pain in the muscles of the neck, pain in the loins, and in most cases headache of very unusual severity.

The other phenomena were various: in five cases nausea and vomiting, in two constipation; overaction of the heart in two cases; herpes in two; in one case an eruption of "hyperæmic" spots, which rapidly increased in number, were somewhat rounded, as large as a lentil, somewhat elevated, and seated especially in the upper extremities, and less on the trunk than on the lower limbs; in all cases there was more or less fever, but in one only did the attack commence with a chill.

As regards treatment, local depletion seemed to be advantageous in sthenic cases; ice in bladders was applied to relieve the pain in the head, and appeared to be of some advantage. To the spine its application was more hurtful than useful. Morphia appeared to assuage the spinal pain in one case, in which also chloroform by inhalation and in liniment was used. This case ultimately recovered. The iodide of potassium was administered in three cases which terminated in cure. Thirty grains a day were prescribed, and this dose continued for nine, eleven, and thirteen days in the several cases. The medicine was given when the symptoms seemed almost to forbid a favourable prognosis. In one case, remarkable for the intensity of the pains, it seemed to exert no beneficial influence, and, after a trial of eleven days, was abandoned. Dr. Wunderlich, therefore, believes that iodide of potassium is to be recommended, especially in protracted cases of the disease.

Dr. Wunderlich states that he has not heard of any instances of cerebro-spinal meningitis since the epidemic which prevailed in Europe from 1838 to 1849. His own narrative is the only one that we have met with of any foreign cases since our painful acquaintance with the disease at home. A. S.

15. *Epidemic Cerebro-spinal Meningitis in Berlin.*—The Berlin correspondent of the *Medical Times and Gazette* gives (April 22, 1865) the following account of the symptoms and post-mortem appearances in a case of this disease, observed by Dr. FRENTZEL in the barracks of the Alexandria Regiment.

J. M., aged 20, previously in good health, had rigors one night, and complained of headache. He vomited a mucous liquid once. In the morning he was almost unconscious, and did not answer questions. The head was drawn backwards, the muscles of the neck very rigid, and slight pressure on the nape of the neck, especially near the vertebræ, made him scream. The abdominal muscles were also rigid, and pressure on the parietes was painful. The patient lay on the side or on the stomach, but not on the back. Mouth firmly closed, considerable force being necessary to open it in order to see the tongue. Roseola over the whole surface of the body; but this disappeared the next day. Chest healthy; no tumour of the spleen; pulse 75 in the morning—100 in the evening; temperature 103.6; number of inspirations 30; pulse next morning, 132—in the evening, 92. On the third day the pupils appeared very much contracted, and did not act against light. The patient, who had been delirious during part of the previous day and night, became now very quiet and comatose. There was opisthotonos, and great sensitiveness of the back. On the fourth day, there appeared inflammation of the orbit, prominence of the eyeball, and œdema of the conjunctiva. The next day there was a bloody motion and bleeding from the nose. On the morning of the sixth day death ensued. The autopsy was made thirty-three hours after death, the temperature being then 55°. Livid spots along the back and the extremities; muscles of the back very dark. The dura mater of the spinal cord generally pale; the veins considerably filled on its posterior surface. It had a yellowish colour in the lower parts of the lumbar portion; and the pia here contained a considerable quantity of fluid, pale, yellow pus. The quantity of pus in the pia diminished towards the upper part of the spine. In the cervical region there was no pus at all. About the seventh cervical vertebra the veins were more filled than usual. Purulent infiltration extended below on both sides, from the cord to the posterior roots of nerves, which in their course in the vertebral canal were completely enveloped by pus. On the *anterior* surface of the spinal cord the internal aspect of the dura was normal. In the lumbar portion of the pia there was considerable purulent infiltration; in the dorsal portion this was only seen in a few places; the cervical portion was normal. Cervical portion of the cord normal; in dorsal portion the white matter was rather moist; at the posterior horns pretty extensive injection of bloodvessels; the gray matter of lumbar portion was extensively reddened. *Skull* large; top rather thin; diploe full of blood; dura hyperæmic; numerous soft coagula in sinus longitudinalis; inner surface of dura dry; pia rather dry on the gyri, while the large veins in the sulci are filled with a great deal of dark blood; pia there being œdematous, and infiltrated with pus. Pus most considerable on the left side close to the median line, but also on the right side, especially in the anterior portions. Pachionian granulations likewise filled with pus. Extensive purulent infiltration on the basis cerebri, more especially at the infundibulum and the anterior portion of the pons. Both optic tracts thickly covered with pus; posteriorly the pus follows the course of the basilar artery; is very thick on the vermis inferior of cerebellum. Lateral ventricles rather wide, contain a yellowish turbid liquid. Velum choroides thickened, contains a yellow mass which cannot be separated, but is in the tissue itself. Brain matter very flabby; vessels of white matter congested. Gray matter dark and extensively reddened. Near the left corpus striatum, at the nucleus lentiformis, numerous extravasations of blood. Fourth ventricle wide. Between the lower surface of the pons and the aqueduct of Sylvius a fissure filled with fresh blood. Extensive purulent infiltration of left orbita, but no changes in periosteum, muscles, or retina. Sinuses at the base of the brain contain much dark and nearly coagulated blood. The appearances in the other organs did not show anything worth mentioning.

16. *Some Forms of Delirium or Acute Insanity during the Decline of Acute Diseases, especially the Delirium of Collapse.*—Dr. HERMANN WEBER, in a paper read before the Royal Med. and Chir. Soc., commenced with the remark that he did not intend to treat on the usual delirium arising during the increase and acme of acute diseases, but on a form which occurred occasionally after the crisis, or towards the termination of such diseases, and which was attended with the phenomena of collapse, a form which he was inclined to designate as the

"delirium of collapse," and which resembled much more the mental derangement usually termed insanity than the common delirium. After having alluded to the literature of the subject, he described seven cases, which in reality were equal to nine, as in two of them there were two separate attacks of disease; and he remarked that the delirium occurred when the pyrexia and the other active symptoms had already much abated; that in all there was a feeble, mostly frequent, and sometimes irregular pulse; that in the majority the face and extremities were more or less cold, and the skin in profuse perspiration. The delirium was characterized by the suddenness of the outbreak, which almost always occurred on waking, and more frequently in the early morning. The delusions were in the majority of cases of a fixed nature, and the subjects of a gloomy kind, repeatedly traceable to the occupation of the mind just before the commencement of the illness. There were hallucinations of the senses, especially of hearing, but occasionally also of sight. The duration of the mental derangement varied from eight to forty-eight hours. The condition of the brain and nervous system appeared to be allied to anæmia; and to be connected with that peculiar shock not rarely experienced by the whole system during the decline, but sometimes also at the time of the crisis of acute diseases, and significantly termed "collapse." The writer alluded to the occasional but more rare occurrence of transitory mental derangement, different from the common, febrile delirium, during the increase of acute diseases, which might be similar to the derangement in the cases before the Society, and father to the mental aberrations occurring during the advanced convalescence. He maintained, however, that not all the mental disturbances observable during the decline of acute diseases were of one and the same nature; and considered also the peculiar delirium of insanity arising during, and at the decline of, rheumatic fever as different from the delirium here described as the delirium of collapse. Regarding the treatment, Dr. H. Weber thought that rest and the use of stimulants externally and internally, according to the degree of the collapse and the concomitant circumstances, would probably in the majority of cases suffice, but that opiates, which in this condition seemed to be well borne, even in large doses, appeared to accelerate the recovery.—*Med. Times and Gaz.*, April 29, 1865.

17. *Aphasia*.—Prof. TROUSSEAU has given this term (from ἀφασία, speechlessness) to a particular form of paralysis causing an inability to give expression to the thoughts by speech, an affection of which he has prominently treated in his clinical lectures. In those lectures he relates the following case, which is the more valuable, as the subject of it was himself one of the most eminent professors of the French school, and who, having devoted a long life to the investigation of cerebral disease, was particularly well qualified to appreciate and record the symptoms which he experienced in his own person.

Dr. R., being confined to his house from the effects of an accident, had been reading nearly all day, and had thus fatigued his brain. He was engaged in reading one of Lamartine's literary conversations, when all on a sudden he perceived that he imperfectly understood what he was perusing. He stopped a moment, then resumed his reading, but again experienced the same phenomenon. In his alarm, he wished to call for assistance, when, to his great astonishment, he found himself unable to speak a word. He now fancied himself the subject of apoplexy, and he immediately caused his arms and legs to execute various complex movements, and found there was no paralysis. Being alone, he rang the bell, and when his servant came he could not speak a word. He moved his tongue in all directions, and was struck with the strange contrast which existed between the facility of movement of the vocal organs and the impossibility of giving expression to his thoughts by speech. He now made a sign that he wished to write; but when pen and ink were brought, although he had the perfect use of his hand, he found himself quite as unable to give expression to his thoughts by writing as by speaking. On the arrival of a physician, at the end of two or three hours, Dr. R. turned up his sleeve, pointed to the bend of the elbow, and clearly indicated that he wished to be bled. Venesection was hardly finished when a few words could be uttered. By degrees the veil seemed to be

removed, and at the end of twelve hours speech was entirely restored; or, to use Prof. Trousseau's emphatic language, "tout était rentré dans l'ordre."

Dr. FREDERICK BATEMAN relates (*Lancet*, May 20, 1865) the following case, which came under his observation:—

Wm. S., a waterman, aged 51, was admitted under my care in the Norfolk and Norwich Hospital on April 1st, with the following antecedent history. On the 9th December, after unloading the vessel in which he had conveyed a cargo of goods along the river from Norwich to Yarmouth, he went into a tavern to ask for some beer, but when he entered the house he found he could not speak. This loss of speech was not preceded by any premonitory symptom, and it was clearly unaccompanied by any other paralytic symptom. For, although speechless, he on the same evening removed his vessel from one point of the river to another, and on the following day loaded it with a fresh cargo, after which he took the train to Norwich, walking from the railway station to his home, a distance of a mile. His friends, finding that his vocabulary was limited to the words "Oh dear! oh dear!" sent for a surgeon, under whose care he continued till a few days before he came to the hospital.

State on Admission.—His condition is that of a healthy-looking man, with an intelligent countenance, looking me straight in the face when addressed, evidently understanding all that is said; but although his ideas appear to arise in great number in his brain, he is unable to give expression to his thoughts by articulated language except in the most imperfect manner. I am informed, however, that he has been slowly improving in this respect since his complete loss of speech three months ago. He has the proper use of his limbs, which are quite free from the slightest abnormal sensation. Deglutition is unaffected. The tongue is protruded straight, and he can execute all the different movements appertaining to that organ. The only features to notice in the tongue are, that the right half is slightly raised above the level of the left half and is more flabby, and that when told to protrude it he keeps it out a long time, as if from deficient memory, he probably not remembering what he had done. He is very cheerful, and does not weep from emotional causes, like persons with ordinary paralysis, nor has he that distressed countenance usually observed in the subjects of grave cerebral disease. I am informed by his relatives that some weeks after the first attack he experienced slight numbness in the *right* hand, which, however, soon passed off.

So long a time having elapsed since the attack, I have felt that little could be done in the way of treatment. He has, however, slightly improved since his admission, under the use of small doses of phosphates of iron and zinc with dilute phosphoric acid, and careful attention to diet.

Dr. F. gives the following as his conclusions respecting the pathology of aphasia:—

1. That it is probable that early observers may have confounded ordinary paralysis of the tongue from mechanical injury or disease of the hypoglossus with that loss of the memory of words and inability to give expression to thoughts which characterize aphasia.

2. That although further observations are necessary to place the pathology of this affection on a firm basis, the majority of cases recorded tend to favour the doctrine of localization in the *left* hemisphere, further investigations, however, being required to substantiate M. Broca's statement that the lesion is limited to the posterior part of the third frontal convolution. The physiologist may ridicule the notion that an organ so perfectly symmetrical as the brain can have one hemisphere possessing a function not appertaining to the other. I must, however, remind him that this is not the only singular and inexplicable fact which physiology presents to us. Prof. Trousseau, alluding to this subject, says he has never seen intercostal neuralgia except on the left side. Why is this? We know nothing about it, except that it is a symptom depending exclusively on an affection of the left side of the spinal cord.

The question of the localization of speech has now occupied the attention of the members of the French Academy of Medicine during several of their recent sittings, and still remains one of the *questiones vexatæ* of the day.

18. *Progressive Locomotive Ataxia*.—Dr. PAUL TOPINARD, in a recent essay which received the Civrieux prize for 1864, gives the following as his general conclusions at which he has arrived from his investigations respecting this disease:—

“3. Progressive locomotive ataxia has been included in Germany among the numerous species of *tabes dorsalis*, and even described with sufficient accuracy by Hufeland, Steinthal, Wunderlich, and Romberg. In England, Todd has marked out one of its forms with precision. M. Duchenne, in France, has given the most complete clinical description of it up to that period (1858). 4. Progressive locomotive ataxia is a morbid variety detached from the group of affections known as chronic myelitis. The precise information we possess upon it, its frequency in practice, the importance of its anatomical lesion, the combination of its two fundamental clinical characters—namely, primary functional disturbance of the cranial nerves, and ulterior locomotive ataxia—authorize its being named and described separately. 5. The anatomical lesions occupy—1st, the periphery of the cranial nerves; 2d, the posterior columns of the spinal cord through a great part of their length; 3d, the posterior roots of the spinal nerves; 4th, exceptionally, the nerves of the limbs; it is an atrophy of the nervous tubules, with hypertrophy of the intermediate elements; it represents the advanced stage of a morbid phase which up to now has escaped our recognition and our formulæ. 6. Progressive locomotive ataxia has its origin often with the other affections passing under the name of chronic myelitis. Sometimes it touches upon general paralysis. Two of its modes of termination are insanity and paralysis. In close relation with it is a malady the history of which is yet to be written, in which gray degeneration attacks the brain, the cranial nerves, the anterior columns more than, or as well as, the posterior columns, without locomotive ataxia forming any part of its symptoms. The word ‘entity’ is thus inapplicable to progressive locomotive ataxia. 7. The primary cause which engenders progressive locomotive ataxia operates upon the whole of the nervous system, with a preference for the medulla, just as calcareous degeneration affects the whole of the vascular system, with a preference for the valves of the heart. In making progressive ataxia a disease of the cord, we imitate those physicians who, in the latter instance, recognize mainly an affection of the heart. 8. Progressive locomotive ataxia presents itself under three forms: the first, complete or general, in which the disturbances of the cranial nerves show themselves some years before those of the limbs, or at the same time with them; the second, damaging, or paraplegic, in which there is merely deficiency. (Sometimes the ophthalmoscope or the autopsy unsuspectingly demonstrate their existence); the third, cerebral, characterized by superadded cerebral symptoms. 9. The progress of the disease is not fatally progressive; it exhibits stationary conditions of long duration, and even some spontaneous retrogressions. The spinal symptoms are generally severe at outset, and more or less apparent in the four limbs. The third or advanced period has for its principal symptom an alteration in muscular power. Up to the present time there exists no instance of a recovery from an unquestionable progressive locomotive ataxia. Death succeeds by an intercurrent disease. 10. The physician can give relief, can suspend the progress of the malady or ameliorate it. He will have thus an active part to play; in the first place he will judge from the indications, and will rest, according to the individual upon hygienic treatment, upon tonics, hydrotherapeia, sulphurous baths, mineral waters, revulsions to the spine, etc., each one of which appropriately used will give him some success. In the last place, he will seek assistance from empirical agents—that is, in fault of anything better, from nitrate of silver. Progressive locomotive ataxia rejects an uniform treatment, and up to the present time possesses no one specific remedy. 11. The locomotive ataxia in this form of disease does not coincide necessarily with an integrity of the motive power. It is dependent neither upon muscular debility, nor upon cutaneous anæsthesia, nor upon muscular anæsthesia, nor upon mixed anæsthesia. 12. The muscles are endowed with two kinds of sensibility; the one general, appreciable by means of electricity, pinching, or the bistoury when they are the seat of inflammation, etc.; the other, special (or sensorial)—the sense of muscular activity. The perception of passive movement, the knowledge of position as well as sensibility to pressure,

depend upon a complex sensibility, in which all the tissues of the limb concur. 13. Walking, in the physiological condition, is subordinate, like respiration, to two influences; the one, which commands—periodical; the other, which executes and co-ordinates. The former is the will, the latter is the reflex power of the spinal cord. Locomotive ataxia is produced whenever the reflex power is altered or diminished. 14. Locomotive ataxia, properly speaking, is marked by a truly characteristic physiognomy only in the lower limbs. Its effects in the upper limbs approach those which determine in them trembling, incomplete paralysis, and cutaneous anæsthesia. The reason is, that the reflex or co-ordinating power, of which locomotive ataxia is the functional disturbance, is physiologically less developed in the brachial than in the lumbar portion of the spinal marrow.”

19. *Infantile Paralysis*.—Dr. W. ADAMS mentioned (March 16), at a meeting of the Harveian Society of London, that he had frequently had to treat cases of this affection, and that in some instances he had been able to restore the power of locomotion where it had been supposed to have been irretrievably lost. Infantile paralysis came on frequently during teething, at the age of one or two years. Both legs or both arms are paralyzed suddenly or in the course of a few hours, or only one limb may be affected. Sir B. Brodie used to say that unless this paralysis is naturally recovered from in six months, it is hopeless. In three to six months there is usually the greatest amount of recovery, the rectus muscle of the thigh often being the last to recover. As to the pathology of the disease, Mr. Adams confessed that he knew nothing of it. The most recent German writers on the subject attribute it entirely to the muscles; and Rilliet and Barthez recorded only two *post-mortem* examinations. In these, as well as in the one made by Mr. Adams, no appearance could be made out to account for the disease, and children do not die of it. Consequently the cause of it is not investigated. If practitioners were but aware of this fact, they would probably make the necessary examinations. It must be remarked that natural recovery of the muscular powers may progress from six months up to three or four years, during which time a series of events takes place—namely, contraction of all the joints. Mr. Wilkinson had lately brought him a child with great contraction of the knee-joints. The muscles around the hip-joints are usually the first to recover. A child was sent him from Clifton, of the age of from six to seven, which had never stood. It had contraction of the joints, arms, legs, and trunk, and Mr. Adams was able to promise the parents of the child that it should walk in three months. Dr. Brown-Séquard had requested Mr. Adams to see a young lady, aged seven years, in consequence of paralysis of both legs, and in three months this child was able to walk with steel supports. If a child could use the psoas and iliacus muscles, it could be made to walk, and this was the practical test. It should be laid down upon the floor, and if it can draw up its knees, success is certain. With regard to treatment in the early stages, he had known counter-irritation down the spine used, but the chances were that no treatment would do much good. When the child has paralysis with flaccid muscles, rubbing and warm clothing are of use. Galvanism of both legs under water is also useful, notwithstanding that many physicians and surgeons disparaged this remedy, and said it had been tried and found to be valueless. He (Mr. Adams) used two tin boots, filled with warm water, in each of which the little patient's foot is placed, and galvanism is applied. Dr. Gull had written some valuable papers on galvanism in the *Guy's Hospital Reports*. The nutrition of the limb must, if possible, be maintained. Dr. Junod's boot for exhausting the air was once in much repute, and is now, perhaps, too much neglected. A paralytic patient of his could always warm the leg in ten minutes by this apparatus; the boot has had no bad effects, but is liable to get out of order. It is, doubtless, a most useful remedy in many cases of paralysis. In some cases of infantile paralysis the rectus muscle remains paralyzed for life, and the leg swings; but this can be compensated for by mechanical means, so as to enable the child to walk.—*Med. Times and Gaz.*, May 20, 1865.

20. *Therapeutic and Physiological Action of Chloroform in Epilepsy*.—Dr. W. M. MURRAY, of Newcastle-on-Tyne, in a recent paper (*Med. Times and Gaz.*,

April 8, 1865), observes Dr. Russell Reynolds has detailed in his classical work on epilepsy the effects produced on that disease by the inhalation of chloroform till the patient is fully under its influence. He uses the chloroform thus when an attack is threatening, and at certain intervals afterwards, and concludes that when administered in this way "it may delay the attacks for a time, but it exerts no permanently good influence." The plan of treatment I have adopted (the results of which are about to be detailed) differs from the above in some important particulars, although the principle on which it is administered seems to be the same.

1st. The chloroform is inhaled in quantities so small as to stop short of inducing unconsciousness, except of the most trifling nature.

2d. It is administered two or three times daily for a period of two or three months at least.

3d. It is given regardless of the fits, never being given to ward them off, and never omitted because of their occurrence.

The principle on which it is administered is that of paralyzing the upper ganglia of the sympathetic, to induce conditions (hyperæmia) tending to unconsciousness, the very opposite of those which occur at the onset of an epileptic attack. Thus the primary influence of the drug as a stimulant to the brain, by inducing hyperæmia thereof, is brought to bear upon that organ thrice daily for a long period of time, and it is believed that there are cases of epilepsy in which this treatment must and does prove beneficial.

I should have used the NITRATE OF AMYLE instead of chloroform in some of these cases had the agent been less dangerous; for it seems to be the most powerful means we possess of exciting the heart's action, and producing results similar to those which follow paralysis of the sympathetic in the neck. When a few drops of the nitrate of amyle are inhaled, the heart's action increases by forty beats per minute, and the head, face, and neck become suffused by an intense hyperæmia; at the same time cerebral symptoms, such as throbbing and a sense of fullness of the head, indicate corresponding hyperæmia in the cranial cavity and its contents.

Dr. Murray reports several cases of epilepsy in which he has employed chloroform, and adds, from all this it appears that in accordance with the view taken of the physiological action of chloroform administered in this way, its therapeutic properties are to be relied on in cases of epilepsy where there is manifest loss of brain power. In such cases it seems to lead to increased vascularity of the head and consequent stimulation of the brain, accompanied by that excitement of the system which occurs in the very first stage of chloroformosis. It seems to do positive harm in cases where the brain is active and excitable, and in cases where the mental faculties are of average power and unimpaired no appreciable effect is produced on the disease.

In none of the cases in which the remedy was tried for a lengthened period has its use been followed by injury to the mental faculties.

21. *Treatment of Diphtheria with Ice.*—Mr. J. DUGGAN states that he has successfully employed ice in the case of a man affected with diphtheria. He ordered the patient to keep constantly swallowing small particles of ice, and also to keep continually sucking and melting icicles in his mouth until he should see him again on the following day, advising him to carry out his intentions most assiduously. On visiting him the evening of the next day "I was agreeably surprised," he says, "to find him much improved, the tensive swelling of the throat to a great extent subsided, and the inflammation of the internal fauces and the tumefaction of the velum pendulum palati (to which was attached the peculiar adventitious membrane) greatly reduced. I impressed upon him to continue using the ice as usual. As he complained of being weak, I gave him a mixture of infusion of bark and tincture of snakeroot, to take two tablespoonfuls three times a day, and to have an abundance of fresh milk and beaten eggs for food. He pursued this course of treatment for a few days, and, to my gratification, ultimately recovered from this dangerous disease.

"Although this is essentially a blood disease, yet the application of cold to the internal parts of the throat will be found of much benefit and a source of great

comfort to the sufferer. Of course it will be necessary to prescribe tonics and nutritious food to support the weakened system, and mild alteratives to improve depraved secretions. This mode of treatment—viz., by the constant swallowing of ice—may not be novel for aught I know, but I have never met it in books. To the practitioner where ice can be got at any moment, I would advise a trial in this and other kindred diseases of the throat, as it has the advantage of being harmless and simple in its action.”—*Medical Press*, April 26, 1865.

22. *New Specific Remedies for Gonorrhœa*.—DR. THOS. B. HENDERSON introduces (*Med. Times and Gaz.*, June 3, 1865) to the profession two new specific remedies for gonorrhœa. The first is the oil of yellow sandal wood, which is obtained by distillation from the wood of *Sirium myrtifolium*, an East India tree.

Dr. H. says: “In my experiments with this drug, I have found it perfectly innocuous even in large doses. From twenty to forty minims three times a day, diluted with three parts of rectified spirit, and flavoured with ol. cassiæ or ol. cinnam., is the ordinary formula I employ; water and a confection after. In cases of the disease at the first, second, or third stage, in susceptible persons, I have often seen the most marked suppression of the discharge within forty-eight hours. It has the great advantage of being a pleasant medicine, not liable to cause sickness, agreeable to the taste, and grateful to the stomach. It is a medicine, as to efficacy, in my opinion, equal, and frequently superior, to bals. copaib. or cubeb pepper. I have often succeeded with it when both had been fairly tried and failed. Besides, it is convenient and portable; and if the patient is delicate, or in bad health, or the system disordered, the possession of a remedy which will act as a stomachic medicine and cure the disease is, I think, to be highly valued. I have used it in many cases during the past five years. I have no theory to offer as to its mode of acting. My experiments have been numerous, but entirely of a practical character. The odour of the drug is slightly perceptible in the urine. Its action on the urethra is observed, in susceptible cases, within a few days after beginning its use. Almost every druggist keeps it for perfumery purposes.”

The other remedy is the gurjun or gurjun balsam, or wood oil, the product of the *Dipterocarpus turbinatus*, an immense tree, a native of India. Dr. H. states that he has only used this “in cases where copaiba had been fully tried and failed. In every case it was successful within a week. No symptoms of inconvenience in any of the cases were produced. I gave it in what may be called large doses—a teaspoonful two or three times a day, uncombined. I have not been able to investigate its action further, as my supply became exhausted, and it is not easily procured in this country. I am thoroughly convinced it is an excellent medicine.”

Dr. O'Shaughnessy employed it according to Dr. Waring (*Manual of Practical Therapeutics*) in numerous cases of gonorrhœa and gleet; and the results seem perfectly conclusive that in the treatment of these and other affections of the genito-urinary system the essential oil of gurjun is nearly equal in efficacy to copaiba. It generally causes a sensation of warmth in the epigastrium, eructations, and sometimes slight purging. It greatly increases the quantity of the urine, which has a terebinthinate odour. Dr. O'S. found that some obstinate cases of gonorrhœa and gleet, which had long resisted copaiba and cubebs, were cured by this remedy. E. J. Waring writes: “In the few cases I have had an opportunity of trying it, the results have been uniformly satisfactory. It might be advantageously introduced into English practice as a cheap and efficient substitute for copaiba. The dose is ten to fifteen drops thrice daily.”

23. *Resolvent Properties of Fresh Parsley Leaves (Petroselinum sativum) in Engorgement of the Female Breasts*.—DR. M. NEUCOURT highly extols (*Revue de Thérap. Méd.-Chirurg.*, June, 1865) the resolvent properties of the fresh parsley leaves in milk engorgements of the breasts. He relates three cases in which he resorted to this remedy with success. He had the breasts covered with fresh parsley leaves, and the application renewed three times a day.

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

24. *On Osteo-Myelitis Consequent on Gunshot Wounds of the Upper and Lower Extremities, and especially on the Treatment of Stumps affected with Osteo-Myelitis after Amputation necessitated by such Injuries.*—Mr. THOMAS LONGMORE read a paper on this subject before the Royal Medical and Chirurgical Society, Feb. 28, 1865. The author commenced his communication by noticing the particular interest which had been excited amongst military surgeons, especially French surgeons, during the last few years in the subject of osteo-myelitis, or endosteitis, as it is called by some writers, after gunshot wounds of the extremities, and of its proper treatment. The interest arose, not from any belief that a difference existed between the nature of the inflammation of the medullary tissue when developed after gunshot injuries, and the corresponding inflammation occasionally seen after the ordinary injuries and amputations of civil life, but from the comparative frequency of its occurrence after gunshot injuries, and after amputations consequent upon them, together with its severe and obstinate character, often in men of previously sound constitutions, in military practice, contrasted with the comparative rarity of its occurrence in sound constitutions in civil practice. After the Crimean campaign, Dr. Valette, a French military surgeon, who had one of the large hospitals at Constantinople under his charge during the period of the war, and again, since the Italian campaign of 1859, M. Jules Roux, the principal surgeon at the large marine hospital of St. Maudrier at Toulon, had both written at considerable length on the subject. Dr. Valette's observations were chiefly directed to this inflammation in its earlier and more acute stages, as witnessed amongst the wounded sent directly after the battles of Alma and Inkerman, amongst whom it had produced the most fatal consequences. The author remarked that in perusing Dr. Valette's reports, the conclusion could scarcely be avoided that the so-called osteo-myelitis, in a large number of the instances referred to, must have been truly cases of pyæmic poisoning, and that in all, the symptoms of the osteo-myelitis must have been greatly aggravated by circumstances tending to the development of pyæmia. Dr. Valette found all attempts to check the disease ineffectual, and came to the conclusion that all resections and amputations for the effects of this inflammation after gunshot fractures should be abandoned, and exarticulations substituted, the wounded being scattered at the same time in tents as widely as possible. M. Jules Roux's observations were made on the disease in its more chronic condition, and he was led to advocate the same views with regard to the necessity for exarticulation as had been advocated by Dr. Valette. M. Roux had under his care about 2000 soldiers who had been wounded in the Italian campaign, a considerable number of whom presented diseased conditions demanding consecutive amputation or other surgical interference. At first M. Roux practised amputation, but with such unfavourable results that he was induced to try exarticulation in similar cases instead. This operation proved remarkably successful. There was no death out of twenty-two successive cases, among which were four cases of exarticulation at the hip-joint. In a memoir on the subject which was read before the Imperial Academy of Medicine at Paris in 1860, M. Roux argued that when osteo-myelitis after gunshot wounds assumes a chronic form, amputation generally only takes away a portion of the inflamed bone, and in consequence of this incompleteness in the operation the disease is aggravated in the remainder. Hence, he asserted, the failure of secondary amputations for gunshot wounds of bones; and hence, also, in his opinion, the preference which ought to be given to exarticulation, or removal of the whole of the diseased bone, when a surgical operation becomes indispensable. The views of treatment propounded by M. Roux has led to several protracted discussions at the Academy of Medicine at Paris. They were particularly analyzed in an elaborate discourse by Baron Larrey, which he afterwards published. In this discourse Baron Larrey arrived at certain conclusions,

six in number, with the general terms of which the author said he believed most English army surgeons would agree. The following are the conclusions referred to: 1st. Osteo-myelitis after gunshot wounds is more frequent than has been hitherto supposed; but is not inevitable, and in most instances is a means of cure. 2d. It may either be limited to a given point of the bone, extend itself partially, or invade the whole of the bone more or less quickly. 3d. Every rational mode of treatment must be adopted in the first instance. We are encouraged to do so because we know osteo-myelitis is susceptible of spontaneous cure. 4th. Sometimes it necessitates resection, and sometimes consecutive amputation, and sometimes, in certain cases, exarticulation is preferable: 5th. The existence of osteo-myelitis is sufficient to explain the want of success which occasionally follows partial operations in bones affected with this inflammation. But, 6th. It does not justify the too exclusive proposition in surgery, that resection of joints and amputations in the shafts of bones are to be abandoned for exarticulation in all such cases. The author of the present paper thought, however, that the settlement of the question of the proper treatment of chronic osteo-myelitis might be carried a step further in precision, especially in cases where want of success had seemingly followed partial operations on account of its presence. Many cases, he stated, came before military surgeons, in which, after amputation had been performed in continuity for gunshot injuries, or for the effects of osteo-myelitis consequent upon them, the portions of the limbs left afterwards presented such diseased conditions as to necessitate further surgical interference in order to avert fatal consequences from the patients. In these cases, where the morbid state of all the tissues is manifestly due to the continued osteo-myelitic action subsequent to the amputation, what is the course to be pursued? The arguments of M. Jules Roux would urge most forcibly in these cases, that exarticulation is the only treatment that can scientifically be adopted; and even according to the conclusions of Baron Larrey these would appear to be the "certain cases" to which he refers in his 4th conclusion, where curative treatment in the first place and consecutive amputation in the next place having failed, disarticulation would be the preferable course to follow. The author had been led to adopt a different conclusion; and in order to show to the society the grounds on which his conclusions had been based, he called attention, firstly, to certain preparations belonging to the museum of the army medical department from cases in which exarticulation had been performed, or death had occurred on account of osteo-myelitis; and secondly, to the histories of some similar cases in which a cure had been effected without exarticulation being resorted to. The first three preparations exhibited consisted of the upper portions of three humeri. In each of these the history was—amputation at the middle of the upper arm for a gunshot wound, and exarticulation at the shoulder within a year afterwards for osteo-myelitis. The fourth preparation was one of the upper part of the femur which had been removed from the patient after death. Amputation had been performed in the middle of the thigh for a gunshot wound in India, and the patient died about a year afterwards from the effects of osteo-myelitis in the stump. There was every reason to believe that in all these cases the osteo-myelitis was due to the shock of the original gunshot injury, and not to any peculiarities in the amputation or other causes. To show that the simple shock of a gunshot wound is capable of giving rise to general endosteitis in a bone, another preparation was exhibited in which the entire shaft of the femur had been subjected to the action of this inflammation. In this case a musket ball had only penetrated the soft tissues, and struck the bone, without producing complete or even a partial fracture of its substance. Another preparation of the upper half of a humerus was exhibited from a case in which the author had performed exarticulation for osteo-myelitis four years ago, before his attention had been turned to other modes of treatment. In this case the previous amputation had been performed for the effects of a kick from a horse, and the preparation was exhibited to show that the consequences of the osteo-myelitis were exactly similar to those which had occurred after the gunshot injuries. All the preparations above named showed, that in each case, extensive necrosis of the shaft had resulted from the endosteitis with which it had been affected; that the necrosed portions were well-defined within fixed

limits; that in no instance was the necrosis continued to apophysis, although in all the cases the apophyses were more or less in the condition known by the term "osteoporosis;" and that the sequestered portions of the shafts were surrounded by copious shells of new bone, as in cases of ordinary necrosis. Three cases were then related in which amputation at the middle of the thigh had been followed by osteomyelitis in the stump, but in which cures had been obtained without exarticulation. The amputation had been performed in two of these cases for gunshot wounds, in the third for the consequences of a compound fracture from a fall. In each of these cases the removal of the sequestra left by the osteomyelitic action was effected by surgical interference, and a sound and healthy condition of the stump resulted. In the case first described, the patient at the time of his admission into hospital at Fort Pitt, from India, had suffered so severely from the effects of the prolonged irritation to which he had been subjected, and the thigh-stump was so extensively diseased throughout, that at a consultation of the staff of the hospital the removal of the stump at the hip-joint was determined to be the only course which held out a fair hope for the patient's recovery. Fortunately, before this serious operation was undertaken, a study of the preparations laid before the society, and some others of a similar kind, led the author of the paper to determine, as a preliminary measure, to open freely the cicatrix of the amputation-wound, and to take steps for removing all pieces of necrosed bone that might be found within the remaining portion of the shaft. The operation was so conducted that, if necessary, it could have been converted at the time into amputation at the hip-joint, or this formidable operation be reserved for a subsequent recourse, if the removal of the necrosed bone did not lead to cure. Complete success, however, attended the first effort: the dead portion of the shaft, which reached up to the trochanters, was extracted, together with some smaller detached fragments. The patient rapidly improved in all respects afterwards, and eventually walked from the hospital with an artificial limb applied to the stump, which had become perfectly sound. The second and third cases mentioned were those of soldiers, who had suffered amputation of the thigh for gunshot wounds, and from subsequent endosteitic necrosis in the stump. In both cases the necrosed portions of the shaft were removed by gradual traction through openings in the line of cicatrix of the amputation-wound. In one of these instances in which the man's limb had been smashed by a round shot just above the knee, at Lucknow, in 1857, an opportunity was afforded of examining the state of the stump five years after the date of the amputation. The stump was then thoroughly sound, and the man able to perform hard work and long journeys by wearing an artificial limb upon it. The motions of the hip-joint were perfect. The author of the paper stated his present conviction to be that if similar steps had been adopted, and the necrosed sequestra removed, in the instances brought before the society in which exarticulation at the shoulder had been performed by himself and others, the stumps might have been similarly preserved: and that in the instances of the femoral stump, and the femur affected with endostitic necrosis, the lives of the patients might probably have been saved by such a proceeding. In cases where amputation had been previously performed, the amputation cicatrix should be opened for the removal of sequestra, or, if more convenient, the stump could be opened from other directions; where no previous amputation had been done, the sequestra should be extricated as in ordinary cases of necrosis. Though not a matter of such importance to avoid exarticulation of a humeral stump, as it is of a femoral stump, owing to the danger to life in the latter operation, and the important use of a thigh-stump for the adaptation of mechanical contrivances for assisting in supporting the weight of the body, yet the author maintained the preservation of a humeral stump to be of great value to the possessor, especially when the power of compressing it to the side is retained. An osteoporotic condition of the articulating heads of the bones, corresponding with the condition shown in the preparations, will not interfere with a successful result if the necrosed sequestra be completely removed. The author alluded to a case in which he had removed a foot at the ankle-joint, in which, on sawing off the two malleoli, the extremities of both the tibia and fibula were seen to be extensively affected with fatty osteoporosis: yet the ends of these bones became

firm and solidified under an improved condition of general health, the removal of the source of irritation which had previously existed in their immediate neighbourhood, and the stimulus of use. There could be no doubt that the head and neck of the femur in the case of the thigh-stump which had been preserved by the removal of the sequestra, the largest of which was exhibited to the society, was in a state of osteo-porosis at the time these sequestra were extracted. The amount of irritation to which the bone had been subjected, the length of time that had elapsed, together with the conditions observed in analogous cases where the opportunity of examining the conditions had been afforded, sufficiently established the fact. The author concluded by observing, that while adopting generally the views of Baron Larrey, before quoted, in reference to the nature, progress, and treatment of osteo-myelitis after gunshot injuries, the following appeared to be fair deductions from the facts and observations he had brought to the notice of the society: 1st. In gunshot injuries of bone, it will be found for the most part—what might be anticipated from the intimate connection which exists between the periosteal and endosteal investments of the bony tissues, and from the violent general mischief effected by the stroke or passage through them of a projectile—that all the structures participate not only in the immediate local destruction, but also in the extended inflammation which follows, whether the inflammation after a time subsides, and terminates in repair, or whether it continues in a chronic form. 2d. There exists this difference between the inflammation of the endosteum and that of the periosteum: that of the endosteum has a special tendency after gunshot injuries to degenerate into a chronic condition analogous to that of suppuration in other tissues, to extend itself along the cancellated structure, and thus to produce disintegration and death of the bony substance; that of the periosteum, at the same time, will exist only to such a degree as to cause it to exert a protective influence by the formation of new bone around the diseased tissues, just as in ordinary cases of necrosis from other causes. 3d. If amputation in continuity be performed while the endosteum is suffering from the inflammatory irritation excited by the violent injury to which the whole bone has been subjected, especially when this has assumed a chronic form, the endosteitis will most probably still pursue its course, even though the divided soft parts may at first become healed, slowly inducing death, more or less extensive, of bony tissue, and, in time, the usual consequences of such a condition throughout the whole stump. 4th. The morbid condition of the endosteum does not usually extend from the shafts of bones into their apophyses. 5th. When amputation has been followed by these consequences, exarticulation should not in any case be resorted to for the removal of the diseased stump until the effect of complete extraction of the dead bone by proper surgical interference has been ascertained. 6th. Experience shows that, even although a patient's constitution may be greatly impaired by the prolonged local diseased action to which it has been subjected; and though there may be every reason to conclude that the articular extremity of a bone is in the condition understood by the term "osteoporosis," yet the complete removal of the endosteitic sequestra may speedily be followed by restoration of the general health, and by a condition of the stump, so sound and firm, that it may be applied to any purpose of utility for which, according to its length and position, it may be competent.—*Med. Times and Gaz.*, March 11, 1865.

25. *Treatment of Aneurism by Lead.*—Dr. G. OWEN REES relates (*Lancet*, March 18, 1865) an interesting case of aneurism illustrative of a new method of cure, viz., by introducing lead into the system with the view of facilitating the coagulation of the blood, a full diet being at the same time given.

The subject was a man 27 years of age, admitted into Guy's Hospital on the 26th Oct. 1864, with popliteal aneurism. The patient stated that seventeen days before he was out walking, when on standing still, he felt pain under the left knee. The pain was relieved by flexing the knee-joint. He then observed a tumour over the seat of pain, which has increased in size up to the present date, but has never caused him much trouble. He has ulcers and varicose veins on both legs, the left being the worse. He is a strong, healthy-looking man, single, and a teetotaller, and has always enjoyed good health. Has worked very hard

lately. The heart-sounds may be considered normal, if we except a slight prolongation of the second sound. The bowels are generally costive. A distinct bruit is heard over the seat of the aneurism, and pulsation is well marked.

Mr. Poland's description of the tumour is as follows:—

"The aneurism was of the size of a duck's egg, and its contents were perfectly fluid. The walls were excessively thin, so that it was feared rupture would take place. Arrangements were made to commence compression at once, and a failure ensued. Deligation of the artery to be performed. Pressure on the artery above readily commanded pulsation, and was attended by complete emptying of the sac without apparent trace of coagulum. It was considered that the opening of the artery into the sac was of large diameter."

Oct. 29th. Ordered three grains of acetate of lead and one grain of opium powder three times a day; to have full diet, and a chop for breakfast.

Nov. 1st. A slight blue line on the gums.

4th. Complaints of loss of appetite, and has frequent calls to stool; the bowels, however, do not act.

5th. Ordered five grains of acetate of lead and one grain of opium powder three times a day.

18th. He complains of loss of appetite. His condition is much the same as on the 4th. Ordered an ounce of castor oil immediately.

24th. The swelling in the popliteal space has been gradually hardening and enlarging, apparently owing to the deposit of fibrin within the sac of the aneurism.

26th. Ordered two drachms of castor oil immediately.

Dec. 2d. Is obliged to discontinue taking the pills on account of the colic produced. The pulsation in the tumour is very much less.

3d. Feels easier; has less pain in stomach. Ordered the magnesia and salts mixture twice a day.

5th. Slept badly, having pain in his stomach; his appetite has much diminished.

12th. The pulsation has ceased, but the tumour is larger and more tender, and he cannot straighten his leg on account of the mechanical obstruction caused by it.

16th. Mr. Hilton found that by pressing the femoral artery he could affect the sac, but thought the aneurism was almost cured. The patient has now a clear, well-defined blue line on the margins of the gums, and feels no pain in the stomach. The articular arteries of the left knee-joint can be seen pulsating very distinctly.

17th. The tumour which almost fills the popliteal space, is diminishing in size. He can nearly straighten his leg. The left leg is flabby, and swells if he stands much upon it, and it measures two inches more in circumference than the right.

20th. The tumour is fast diminishing in size.

31st. He has left the hospital to return to his work.

On January 17th he came to the hospital to be examined by the surgeons, and was seen by nearly the whole surgical staff, amongst the rest by Messrs. Cock, Hilton, and Birkett. He was considered to be perfectly cured. He states that he cannot walk far without feeling a numb sensation over the calf of his left leg, circulation by anastomosing branches being not yet freely established. He has been able to do his work. There is still a clear well-defined blue line on the margin of the lower gum; the upper is less affected. There is also some enlargement in the popliteal space, which he feels somewhat inconveniently when walking.

It will be observed that the doses of lead were large and continued. Thus three grains of the acetate were given three times a day for six days, and then an increase was made to five grains, a grain of opium being given with each dose. This five-grain dose was continued for twenty-six days. With regard to the pains in the abdomen, they never amounted to colic, and my surprise is that the patient did not suffer more. His attention was directed to the probable occurrence of such pains, and latterly he was inclined to exaggerate them. Though rest was enjoined, the patient would not submit to it. He walked about the ward as it pleased him, and, I am informed, danced on one occasion for the

amusement of his companions. It is worthy of remark that when the lead had been taken for three weeks the aneurism had hardened very obviously, and my belief is that we might be content to discontinue the lead should an aneurism begin to change as above described. The system is charged with the metal, and deposit once begun, we may fairly expect it will continue to the filling up of the sac.

26. *Aneurism Cured by Pressure on the Aorta under the Influence of Chloroform.*—MR. HEATH, of the New Castle Infirmary, in commenting on a case of this, remarks:—

“My case was a very unfavourable one, the aneurism being large, the man 50 years of age, very timid and nervous, fat over the belly, and of soft lymphatic temperament. The coverings over the aneurism were thin, and at one point threatened rupture of the sac in no very long time if the impetus of the blood were not stayed.

“Pressure was twice applied to the aorta and origin of iliac without success previously to the final triumph. On the first occasion the man was five hours under chloroform, on the second nearly seven, on the third from half-past nine in the morning until seven in the evening. I was satisfied that pressure would cure the disease, and that sufficient time to allow of consolidation of the large mass of blood was all that was required.

“Pulsation returned as strongly as ever after each of the unsuccessful attempts.

“I have now waited two months, and the aneurismal tumour has almost disappeared. Being assured, therefore, of the reality and permanence of the cure I purpose making the case public, probably by bringing it before the Medico-Chirurgical Society in London.

“We are scarcely yet in a position to say what is the precise change in the contents of the sac in these cases which leads to a cure.

“I have long observed that in aneurisms cured by pressure, the ultimate change has often taken place with great rapidity in my own practice usually, in consequence of greater attention being paid to the application of the pressure, which has consequently been kept on more effectively, and so entirely to arrest pulsation; then almost suddenly an aneurism, which has been under treatment for three weeks, has become consolidated in a few hours, no apparent change having taken place in it previously.

“I was particularly struck with this in a case of *diffused traumatic* aneurism of the anterior tibial artery cured by pressure on the femoral some eight or nine years ago, in my practice at the infirmary here. After some three weeks’ trial of pressure in this case, without any change in the condition of the disease, I was about to give up the plan in despair, knowing, too, that surgeons generally held diffused aneurism to be incurable by pressure. Before relinquishing the treatment, however, I determined to make a strong effort to succeed, and by personally superintending to a considerable degree the application of the pressure, its efficiency was much increased, and the pulsation for some hours entirely stopped; consolidation of the aneurism followed. Probably coagulation of the blood is the first change, afterwards contractile changes in the clot and absorption of the liquid parts. Whatever may be, however, the precise nature of the internal changes, no one can now, after Dr. Mapother’s case and mine, doubt the efficiency of the plan.

“‘The rapid cure of aneurism under chloroform,’ must tend to extend the pressure treatment over a wide area in every sense, and leaves less ground than ever for the advocates of the knife to stand upon. It affords me great satisfaction that the third case of the kind should have occurred in the hands of a Dublin surgeon, the profession being already so much indebted to the Dublin school for the introduction of the pressure treatment.”—*Med. Press*, April 26, 1865.

27. *On the Combination of Distal with Proximal Compression in Certain Cases of Aneurism.*—J. M. O’FERRALL, Chief Surgeon to St. Vincent’s Hospital, in a clinical lecture delivered at St. Vincent’s Hospital, March 10, 1865, re-

marked, "I have long since been of opinion that compression of an artery on the distal side of an aneurismal sac should precede or accompany that on the cardiac side of the aneurism. I have often observed arrest of pulsation easily accomplished, attended at the same time with a flaccid state of the sac; but I have also remarked in such cases that the moment the pressure ceased the sac filled and throbbed as before. The formation of the coagulum is thus desirable as the first step to consolidation. A half empty sac is the ready recipient for the slightest thready current that can follow the cessation of the compressing force on the cardiac side. It, therefore, appeared to me advisable to interrupt the current only when the sac was full of blood. These considerations, together with the knowledge of the fact that ligature of the artery on the distal side has sometimes cured an aneurism when the upper or cardiac portion of the vessel could not be reached, made me resolve to try this expedient whenever a fair amount of pressure was not followed by success. From what I have observed, I am inclined to think that cessation of pulse in a sac which suddenly diminishes in size and becomes flaccid is less likely to be followed by a permanent cure, whatever time may have been occupied in the compression, and that a sac which retains its volume, and is, moreover, full of coagulum, is less likely to be refilled, however short the duration of the compressing force.

"When the supply is completely cut off by ligature of the trunk, I believe that the danger of relapse from refilling of the sac by collateral sources is more likely to occur when the sac collapses and becomes flaccid at the moment of deligation than when its dimensions are unchanged. This firmness of the parietes of the sac is always considered favourable to the success of the operation, as implying the presence of fibrinous deposits, whether we attribute them to stasis of the blood or to inflammatory exudation, as suggested by the researches of that distinguished surgeon, the late Dr. Abraham Colles. I have no doubt, however, that whether a sac be filled by fibrinous deposits of some duration, or by coagulum recently formed, that a full sac is very influential in preventing the ingress of blood from a compressed artery above, or collateral branches from below; the compression below the sac need not, in some cases, last more than a few minutes before the current above is stopped. If, on making the pressure above and arresting the pulsation the sac remains full, the object is attained, and time is merely required to allow the blood then liquid to coagulate in the sac. In other cases, it may be prudent to continue both compressions for a longer time. Three cases have already been treated on this plan with success. The first was published by me in the *Dublin Quarterly Journal* for November, 1846."—*The Medical Press*, March 15, 1865.

28. *Aneurism by Anastomosis of the Scalp treated successfully by Setons and Ligature of Common Carotid*.—Mr. Geo. SOUTHAM related to the Royal Med. and Chirurgical Society (March 14th, 1865) the following case:—

The patient, a married female, aged 28 years, had been suffering from the disease for upwards of eight years. She became an in-patient of the Manchester Royal Infirmary in May, 1864. The temporal artery and its branches, with the exception of those distributed around the eye and forehead (which, though visibly distended, were not pulsatile), were much enlarged, some of them almost to the size of the little finger, and communicating to the hand a distinct arterial thrill. The occipital artery and its branches were also similarly affected, though in a less degree. Pulsation was only slightly checked by pressure on the trunks of these vessels, but was completely suspended by compression of the common carotid. An ulcer had formed over the parietal protuberance, which had bled rather freely on several occasions. An attempt was made to remove the lint from the ulcerated surface; but arterial hemorrhage supervened to so great an extent that the bandages were immediately replaced. On the following day, having taken the precaution to have the requisite appliances for the arrest of hemorrhage at hand, the compress was removed in the presence of several members of the hospital staff. Profuse hemorrhage followed from the ulcerated surface, which occupied a space of about an inch and a half in diameter. Pressure with the fingers failed to stop the effusion of blood, escaping as it did from countless sponge-like orifices. Lint steeped in a solution of perchloride of iron was also

applied, and the carotid compressed; but the blood continuing to flow, with the consent of his colleagues, Mr. Southam proceeded to place a ligature on the trunk of the common carotid, which had the desired effect. Seven days after the operation the vessels of the scalp were soft, flaccid, and apparently bloodless; but very feeble pulsation could be felt in the course of the temporal artery. Four setons of worsted, about four inches in length, were now passed through the vessels, one across the temporal fossa, the others through the parts of the scalp where the vessels were most distinct. The week following, some of the vessels near the original sore were found distended, and slightly pulsatile. Three setons were inserted through them, and another about a fortnight afterwards at the posterior part of the occiput, where a vessel about an inch and a half in length could be distinctly traced pulsating slightly. From this period the case proceeded satisfactorily, and on the 12th of August she left the hospital quite well, with the exception of a small ulcer at the back of the ear, which was the remains of a slough that had taken place in that part. At the end of December there were no signs of any return of the disease. The author remarked that the success of the plan of treatment adopted in the above case afforded a prospect of bringing this hitherto unmanageable complaint more effectually under the control of the surgeon. At the time of the patient's admission into hospital, the disease had arrived at a stage when prompt measures were absolutely necessary for the preservation of life. Accordingly, on the supervention of hemorrhage, ligature of the carotid was immediately resorted to. But the unfavourable results which have frequently followed deligation of the carotid for aneurism by anastomosis of the scalp induced the author not to rely solely on that method of treatment; and the further progress of the case showed that if other means in addition had not been employed, no permanent benefit would have resulted from the operation. This need excite no surprise, for the operation to be successful must either permanently cut off the circulation through the diseased vessels, or lead to their obliteration—conditions which, however probable when the disease is confined to a single vessel, and assumes the ordinary form of aneurism, are not likely to follow when several are affected, as in the present case, involving the entire temporal system, with its arteries, veins, and capillaries. For the blood in the vessels after deligation does not coagulate, but readily finds its way into the general circulation, and the vessels remaining unchanged become again distended as soon as the circulation through the anastomosing branches is re-established. But, despite these drawbacks, deligation, even when not required for the suppression of hemorrhage, has its advantages; for the temporary interruption which it causes to the circulation through the diseased structures affords a favourable opportunity for the application of other remedies. Setons were therefore resorted to as soon as there were indications that the scalp was supplied with blood sufficient for reparative purposes. They were applied at intervals wherever any return of pulsation showed itself. It is unnecessary to dwell on the futility of trusting to setons only in the treatment of these cases. They have so repeatedly failed that their success in the present instance must be attributed to the quiescent state of the circulation produced by the ligature of the carotid. In confirmation of this view, the author referred to the case of a young lady who was under his care several years ago, whose index finger and thumb had become, through enlargement of the vessels, twice the natural size. Some of the vessels were in circumference as large as goose-quills, and gave a livid-bluish appearance to the fingers. Not the least pulsation or arterial thrill could, however, be discovered; and the vessels could be partially emptied of their blood by pressure. Three fine worsted setons were passed from the hand to the apex of the finger. Others were inserted at intervals. At the end of six months all evidence of the disease had disappeared. Deligation of the arteries, therefore, prior to the insertion of setons, does not appear necessary in all cases of aneurism by anastomosis. The disease is an affection of arteries, veins, and capillaries, varying in its characters according to the extent to which each of these structures is implicated. Deligation, therefore, seems to be required where the arterial tissue is principally involved, or where the enlargement of the capillaries has taken place to such a degree as to enable the force of the heart's action to communicate its impulse

through the capillaries to the blood circulating to the veins. Similar considerations will also determine the extent of deligation, which, except where severe hemorrhage occurs, need, in the majority of cases, only be applied to the smaller arteries. Though setons were employed in the case now related, yet galvanism, the injection of perchloride of iron, and other similar agents, may, in some instances, perhaps, be advantageously substituted; and even the risks attending ligature of the arteries may, by instrumental or digital compression, be occasionally obviated.

Mr. C. H. MOORE said the ligature of the carotid in this case was not for the cure of the disease, but for the arrest of excessive arterial hemorrhage. It was quite a different question whether such aneurisms required ligature of the vessel for their cure. In some it would not be necessary; in others the predominance of large arteries might, perhaps, be so great as to demand the operation. He had seen a case in which the tumour was as large as that described by the author in which (under Mr. De Morgan's care) cure had been effected by setons repeatedly passed, by needles, over which were placed caoutchouc rings, and by threads carrying perchloride of iron. By these means the tumour became so much less that the patient could leave the hospital. Five years later he came under the care of Mr. Nunn. He then had an overlap or fold of skin in the position of the tumour, but no trace of the former disease. There was an abscess, of the size of two eggs, which occupied the site of the tumour. Mr. Moore then referred to vascular tumours of the scalp in children, which sometimes attained a formidable size, and then occasionally attempts to cure them were followed by inflammation and death. He had had no experience of tying the carotid in such cases, but when a large vessel was open and it was impossible to tie it or the vessels entering the tumour one after another, it would be necessary to tie the main trunk.

29. *The Surgical Treatment of Certain Cases of Acute Inflammation of the Veins.*—Mr. HENRY LEE read (May 9, 1865) a paper on this subject before the Royal Medical and Chirurgical Society.

He stated that in Mr. ARNOTT's paper on "Inflammation of the Veins," published in the fifteenth volume of the *Medico-Chirurgical Transactions*, he had drawn the inference that the dangerous consequences of phlebitis bear no direct relation to the extent of the vein which is inflamed. He had there proved, by an excellent collection of cases, and by his observations on those cases, that death in cases of phlebitis does not take place from the inflammation extending to the heart, but from the entrance of some morbid product into the general circulation (pp. 44 and 61). In a paper by Mr. Lee, published in the thirty-fifth volume of the Society's *Transactions*, he had endeavoured to show that the material which obstructs the cavities of veins in cases of phlebitis is derived from the blood itself, and is not in the early stages of the disease a secretion from the lining membrane of the vessels; that the veins become extensively inflamed only in cases where coagula have previously formed; and that the purulent-looking fluid, often found in the cavities of inflamed veins, is derived from the changes which, under the circumstances, take place in the fibrin of the blood. The distinction which he wished to establish between the process by means of which fibrin is deposited from the blood, and that by which lymph is secreted from the lining membrane of a vein, was of primary importance, not only with regard to the pathology of this class of diseases, but also with regard to their surgical treatment; for it must be obvious that if the material which occupies the cavities of the vessels in cases of phlebitis were secreted by the inner coats of the veins, it would adhere firmly to that membrane, and would be found lining equally the whole circumference. It would not be displaced by the force of the circulation, nor by any other mechanical means likely to be employed. Moreover, the morbid process would extend by continuity of action, and would not be arrested by any surgical interference. If, on the other hand, the material found in the veins were derived from the blood, it might be expected to adhere slightly only to the walls of the vessels, to be attached to one part only of those walls, and to be removed easily by any mechanical force. It would be deposited in uncertain quantity, and at irregular intervals, leaving portions of the lining

membrane between those intervals free from deposit, and of its natural appearance. The deposit would often, as had actually occurred in some of the cases related by Mr. Arnott, terminate abruptly at the entrance of a fresh vessel; the reason of this abrupt termination being, as it appeared to Mr. Lee, the greater velocity and force of the circulation in the common trunk than in that which is partially obstructed. Now, the appearances actually observed on *post-mortem* examinations in cases of phlebitis all belonged to the latter and not to the former class, and the conclusion necessarily followed that the disease extends, as far as its severer symptoms are concerned, not by continuity of action in the lining membrane of the vessels, but by means of their contents, often in a more or less perfectly coagulated state. If that were the true course of the fatal symptoms in phlebitis, it appeared surprising that more attempts had not been made to arrest the progress of the disease by surgical treatment. Such attempts, however, had not been entirely wanting. Hunter remarked that when inflammation takes place beyond the orifice (of a vein) so as to alarm the surgeon, he should immediately make a compress upon the vein at the inflamed part, to make the two sides adhere together; or, if suppuration has taken place, then the compress must be put upon that part of the vein just above the suppuration.¹ Now, as lymph was not effused in the early stages of phlebitis from the lining membrane as a secretion from its inner surface, the adhesion produced by Hunter's method of treatment could be formed by coagulum of blood only. This would not, under ordinary circumstances, become organized; it would adhere to one side only of the vessel, and it would constantly be liable to become displaced. Such a bond of union, although it might for a time prevent the morbid contents of a vein from entering the general circulation, could scarcely be looked upon as affording a permanent bond of union between the sides of the vessel. In cases where the affected vein is seated superficially, a much more certain and effectual way of closing its canal and of barring the entrance of its contents from the general circulation might be adopted. This method, which, when properly performed, Mr. H. Lee believed to be free from danger, was adopted in three out of four of the following cases. The fourth case was given as an illustration of Mr. Hunter's method of treatment. It would, the author thought, be obvious that, although Mr. Hunter's method might, perhaps, have been successfully adopted in the first case, it could not have been used with any reasonable chance of success in the second and third. Four cases were then read in which, in severe cases of phlebitis, the current of blood was artificially arrested between the inflamed vein and the centre of the circulation. In one instance a pad was placed over the upper extremity of the basilic vein, and retained in its position by a bandage. In two cases a needle was passed under a healthy and unaffected portion of the vein, and pressure was made by means of a figure-of-8 ligature; and in one case the vein above the seat of the inflammation was divided subcutaneously, the two divided extremities being secured by acupressure. Of these different plans of effecting the same object, Mr. Lee preferred decidedly the latter. In any future similar case it was that to which he should have recourse. By the operation of subcutaneous section a permanent union was effected, because that union took place between the opposed portions of cellular tissue on the outside of the vessel. Such a union was vascular, and, therefore, not liable to be broken down. By it no suppuration need be excited, and the needles used for the purpose of acupressure might be removed at the expiration of two, three, or four days, when the union would be complete. Union could not be insured within the same period by the pressure of a needle placed under the vein. If the needle be removed at that time, the current of blood would be liable to be re-established through the vein; if it be left, suppuration might be excited on the outside of the vessel; this might lead to the coagulation of the blood both above and below the part where the vessel was compressed, and the coagula thus formed might undergo the very changes which produced the serious symptoms for which the operation was undertaken. In one of the recorded cases this appeared in some measure actually to have happened, for although the current of blood through the vein

¹ Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, p. 29.

was arrested, yet suppuration took place both above and below the needle last introduced. In another case, on the contrary, where the vein was divided, no trace of inflammation extended beyond the divided part. In both these cases the products of the diseased actions were expelled from the interior of the veins by the process of suppuration; but had the flow of blood through the vessels been allowed to continue, some of these same morbid products would have been carried in the course of the circulation, and would have produced their effects in other and distant organs.

In reply to some criticisms, Mr. Lee remarked that his paper was upon the surgical treatment of acute inflammation of the veins after that disease had already been produced. He had purposely abstained on the present occasion from considering the best mode of operating for varicose veins, or from dwelling on the pathology of phlebitis. Those subjects had been fully discussed on former occasions, and some of the conclusions arrived at were recorded in the *Transactions* of this Society. As, however, the two subjects mentioned had been introduced to the notice of the Society, he might be allowed to say that in the operation for varicose veins it was, in his opinion, a dangerous practice to lay bare the coats of the vein. It was an operation that had been adopted by some of the older surgeons, and had often led to dangerous and even fatal consequences. The question which Mr. Savory had been good enough to ask—namely, whether the lining membrane of veins was liable to ordinary inflammation, and whether lymph could be thrown out upon its surface, was one of primary importance with regard to the pathology of this disease. All recognized the results of inflammation of a vein. After it had existed some time the coats of the vein became thickened; they could be felt as a hard unyielding cord below the skin; and if removed from the body and cut transversely, they would remain open like the coats of an artery; at the same time the cavity of the vein was filled with coagula, or with the fibrin of the blood more or less decolorized. Now, the great question at issue was, Does the inflammation of the vein produce this coagulation of the blood? or does the coagulation of the blood produce the inflammation of the vein? Is the lining membrane of the veins subject to spontaneous inflammation like the serous membranes of the body, and does it, like them, when inflamed, secrete lymph? Now he (Mr. Lee), ever since he had given his attention to this subject, had held that the lining membrane of veins was not at all analogous in its pathological relations to the serous membranes. Being non-vascular, it was not, like them, liable to attacks of spontaneous inflammation, and especially it was not capable, like them, of secreting coagulable lymph. When a serous membrane was inflamed, the lymph secreted united with the lymph on the opposed surface, and the cavity was closed where such a union took place. If the veins were liable to such mode of action, the circulation in our bodies would be constantly and permanently obstructed. But Nature had wisely ordained otherwise. The lining membrane of the veins, even under great irritation, would not secrete lymph; and the obstruction in veins was derived entirely from the materials of the blood. These observations applied to the disease in its earlier stages. During the later stages, when the parts had become altered by long-continued diseased action, the lining membrane of the veins might secrete lymph or pus like other parts. It was so with regard to the cartilages of joints, which might be taken as a rough illustration of the present subject; naturally they contained no vessels, and they could not secrete lymph; but after having undergone changes produced by long-continued disease, they might become permeated by vessels, and then they would secrete lymph and pus like other inflamed parts. In the early stage of the disease, he (Mr. Lee) had never seen a case in which lymph was effused on the lining membrane of a vein, and he held that in all cases of acute phlebitis the severe symptoms depended upon some morbid matter which had entered the cavity of the vein. If a portion of a vein were isolated from the rest of the circulation, and closed at two points by acupressure, the part of the vessel thus isolated might be cut or irritated in any way, and no symptoms of general irritation would be induced; whereas it was well known, from the writings of Sir B. Brodie and some of the older surgeons, what serious and fatal consequences would occasionally follow operations on the veins when such a precaution was not taken. When Ambrose Paré suggested the ligature of divided

arteries as a safe and comparatively painless mode of preventing hemorrhage, it was long before his doctrine was generally received; and it will not be, therefore, surprising if a considerable interval should elapse before the simple mode of preventing hemorrhage on the one hand or absorption on the other, from divided veins by acupressure, comes into general practice. But he (Mr. Lee) could say now, from a very considerable experience in operating upon varicose veins, that it was a plan perfectly effective and free from danger. When properly performed, it not only prevented any symptoms of general irritation from the usual operation of varicose veins, but when from any accidental circumstance inflammation of a vein had arisen, it would (as had been proved by the cases now read to the Society) prevent the extension of the inflammation along the inflamed vessel. This it did, of course, by preventing the transmission of the irritating contents of the vessels, upon which alone he (Mr. Lee) believed the symptoms to depend. With regard to the cases related being instances of genuine acute phlebitis, such as, without some preventive treatment, generally led to a fatal termination, he had only to appeal to the symptoms observed. When a severe rigor occurred in these cases, followed by a profuse perspiration, and the pulse continued from 120 to 140, he need not say that the gravest consequences were to be apprehended.

30. *Resection of the Ankle-Joint where the Bones are crushed.*—During the late Schleswig-Holstein campaign, Professor VON LANGENBECK, who acted as Surgeon-General to the Prussian army, made, amongst many other similar operations, five times the resection of the ankle-joint in cases where the bones were crushed to such an extent that many surgeons would have decided upon amputation of the leg. Von Langenbeck is of opinion that amputation may in many cases be dispensed with not only where the ankle-joint has been opened by a gunshot wound, but also where the bones constituting the tibio-tarsal articulation have been considerably injured. Where projectiles have passed transversely through the malleoli and the talus, a complete recovery may ensue without anything being done but incising the joint for the purpose of providing an exit to the pus, and extracting bone splinters which may be present and are accessible to the surgeon.

It is a curious fact that the resection of the ankle-joint has many times been performed, since the end of the last century, for complicated fractures and dislocations, and for caries, amongst others by Messrs. Gooch, Moreau, Cooper, Jäger, and Textor, but that in none of the numerous wars which have been waged since that time has the same operation been made in gunshot injuries of the ankle-joint. M. Velpeau, it is true, states in his treatise on operative medicine that a Mr. Read had, in a case of gunshot wound of that joint, sawn off the lower ends of the tibia and fibula, and that a useful foot had been the result. Most authors quote this case, after Velpeau, as one of resection; but on close analysis it appears that the operation, which was performed after the battle of Fontenoi, in 1745, consisted merely of the extraction of fragments of bone from the crushed ankle-joint, and not of resection, which latter was not known before 1768. Nevertheless, the case in question, which is fully mentioned in Faure's prize essay on amputation (1759), is one of great interest, and shows how much may be done by conservative surgery.

Neither in the Crimean nor in the last Italian war has the resection of the ankle-joint been performed. Recent authors on military surgery, such as Demme and Legouest, reject the operation altogether as unsuitable. Now, Professor Von Langenbeck had, since 1850, four times performed it in private practice. In all these cases there had been long-continued suppuration after injuries. In two of them there had been complicated dislocation of the foot; in the third, dislocation of the foot, with fracture of both malleoli; in the fourth, that of an old Russian officer, the ankle-joint had been crushed in the battle at the Alma by a Minié ball. In the first two cases a piece of the tibia, three inches long, was resected; in the third, both malleoli and the surface of the talus; in the fourth, a piece of the tibia, four inches long, and the largest portion of the talus. In all these cases the periosteum was completely preserved, and the cure resulted without shortening, abundant osseous tissue being formed. In the second and

fourth cases there was ankylosis; but in the first and third a movable ankle-joint resulted. These two latter patients are now frequently seen by the Professor, and they are able to walk to any distance without inconvenience.

In consequence of the good results thus obtained, the Professor determined on setting out for the Schleswig-Holstein campaign to perform the operation whenever suitable cases might offer. He did it five times between May and August, 1864. All were late operations. One patient died of hospital gangrene; all the others recovered. Two were Prussian soldiers, three Danish prisoners captured in the island of Alsen. In the first case a rifle bullet went into the malleolus internus and came out of the malleolus externus of the left foot. Both malleoli and the upper surface of the talus were resected, the piece taken out being two and a half inches long. The joint is now ankylosed, but the patient is able to walk for a quarter of an hour at a time without inconvenience. There is no shortening, and the formation of new osseous tissue has been so abundant that the circumference of the leg operated upon is much larger than that of the other. In the second case the malleoli were splintered into seventeen pieces to the length of three inches. The resection was done, but the patient died ten days afterwards of nosocomial gangrene. In the third case the lower end of the left tibia and fibula were fractured by a bullet, which went into the crista tibiæ, and came out at the back close to the tendo-Achilles. The foot was considerably dislocated. A piece of the tibia, four inches long, and broken into fourteen fragments, was removed, and the cure was quite satisfactory. In the fourth case the bullet went into the joint just below the malleolus externus, and went out by the middle of the internal malleolus. A piece three and a half inches long, being the lower end of the tibia and the upper surface of the talus, was removed. The cure was complete about two months afterwards. In the fifth case there was total crushing of the ankle-joint, with considerable dislocation of the foot. Both malleoli and the whole of the talus were removed, and the cure was complete in about two months afterwards. The last three patients, however, when last heard of, had not yet commenced walking.

All these operations were done altogether sub-periostally; the periosteum, which was very much thickened, being torn off the bone in connection with the fibrous envelop of the malleoli and the ligaments. The interosseous membrane was always most carefully spared, and this is a circumstance upon which much stress should be laid, because this membrane, being closely allied to the periosteum in texture, according to Von Langenbeck's observations, probably always becomes ossified, is completely amalgamated with the newly-formed bone, and serves to increase the bulk of osseous tissue. The Professor has, in his operation, never laid bare nor injured any tendons, vessels, or nerves. He has sawn through the bones with his stitch-saw by comparatively small incisions. If only one bone was crushed, this one only was removed, and the other bones left undisturbed, even if they were transversely fractured. The cutaneous incision was always made on the inner surface of the tibia or the outer surface of the fibula, but never before or behind these bones. If both malleoli had to be removed, a perpendicular incision was made on the middle of each bone. The operation was, as a rule, not connected with much difficulty, only in the fifth case it proved troublesome, as the whole of the talus had to be removed. The wound was always united by sutures, only a small opening being left for the escape of pus; after that the plaster of Paris splint was put on, and the wounded part rendered accessible by cutting a hole into the bandage. A day or two afterwards the splint was soaked with a solution of resin in ether, whereby it was rendered water-proof, and then local baths were employed. In most cases the first splint was left on unchanged for three or four weeks.—*Med. Times and Gaz.*, March 25, 1865.

31. *Amputation of the Leg by a Long Rectangular Flap from the Calf.*—MR. HENRY LEE, in a paper read before the Royal Medical and Chirurgical Society (May 23, 1865), called attention to Mr. Hey's mode of operating by means of a long flap from the back of the leg, and to Mr. Teale's plan by a long rectangular flap from the front. The advantages of both these plans might be combined by making a rectangular flap from the back instead of from the front

of the leg; a thick soft cushion might thus be provided for the ends of the bones, and no large nerve need be left in the flap. The operation described was performed according to Mr. Teale's plan as far as the external incisions were concerned, but the long flap was made from the back instead of from the front of the limb. Two parallel incisions were made along the sides of the leg; these were met by a third transverse incision behind, which joined the lower extremities of the first two. These incisions, which formed the three sides of a square, extended through the skin and cellular tissue only. A fourth incision was made transversely through the skin in front of the leg, so as to form a flap in this situation, one-fourth only of the length of the posterior flap. When the skin had somewhat retracted by its natural elasticity, an incision was made through the parts situated in front of the bones, which were reflected upward to a level with the upper extremities of the first longitudinal incisions. The deeper structures at the back of the leg were then freely divided in the situation of the lower transverse incision. The conjoined gastrocnemius and soleus muscles were separated from the subjacent parts, and reflected as high as the anterior flap. This part of the operation was performed with the greatest facility, on account of the loose attachments of these muscles, especially at the lower parts of the leg. The deeper layer of muscles, together with the large vessels and nerves, were divided as high as the incisions would permit, and the bones sawn through in the usual way. The flaps were then adjusted in the manner recommended by Mr. Teale. The long flap thus formed was much thicker than when taken from the front of the leg. It was consequently less liable to slough. It afforded a much more efficient protection to the ends of the bones, and a thicker and softer pad upon which to rest a part of the weight of the body when an artificial limb was applied. Three cases were detailed in which this mode of operating had been adopted, and drawings given of the stumps after they had healed. Two other cases were mentioned. In one of these, which was performed after great loss of blood from ulceration of the anterior tibial artery, in a case of very severe compound fracture, the patient died. In the other case the patient made a rapid and good recovery. These were, the author believed, all the instances in which this particular operation had been performed.

Mr. Lee said it was well known that the object of surgeons generally was to prevent pressure on the extremity of a stump by resting the weight on the limb above the cicatrix. So engrafted with this idea are the minds of the mechanicians also that he had the greatest difficulty in persuading them to make an artificial limb which would press on the end of the stump. But an essential part of Teale's operation was that with a stump thus formed the patient should rest on it. This was the great object of Mr. Teale's operation. The cases he (Mr. Lee) had just read were the only cases in which the operation described in the paper had been performed. One of the patients operated on, and whose case was related in the paper, had just written to the nurse, challenging her to walk three miles with her. In this case particular care had been taken to see that the patient did bear on the end of the stump, and that it was not more sensitive than any other part. Mr. Lee then showed a preparation of a stump, and drawings illustrating the points of his paper.—*Med. Times and Gaz.*, June 3, 1865.

32. *Warty Ulcer of the Leg of Thirty Years' Duration; Amputation; Recovery.*—Dr. M. H. STAPLETON exhibited to the Surgical Society of Ireland the leg of a patient, afflicted for the last thirty years with an ulcer which well exhibited all the characteristics of the warty ulcer of Marjolin, and gave the following history of the case: Thadeus Dooley, æt. 50, was admitted into the Mater Misericordiæ Hospital on the 1st of December, 1864. He states that when about 16 or 17 years of age, he was attacked with a great pain in his leg; that the pain was on the inside of it, and that after a fortnight the leg burst, and after a little time there came a sore which ate a hole in it which bared the sinews; that sometimes there used to be a scab on it, but that it never healed; that after some years a little nob came on the bone; that it then became a sore and ate into the bone; that he has had several *doctors* (not real ones), and that each had his way with him, but that he got no better; that some time ago a lot of proud flesh grew out of it, and that he went to a real doctor, who, he

said, burnt it with an aqua fortis, which took away the proud flesh, but did no other good, as it neither healed it nor removed the torture, and that he was not able to use his leg for the last four years before applying for admission. He said he came to town determined to part with his leg, as he could no longer endure his torture.

The ulcer was situated on the lower third of the leg, over the inner side of the tibia and neighbouring soft parts. The surface was irregular, and studded with several hard warty prominences. A probe could be passed into the bone, which was black and carious, and lay at the bottom of the ulcer.

The integuments for some short distance round the ulcer were thickened, the edges were shining but not everted. The discharge was thin, sanious, and very fetid. His countenance was pale, careworn, and expressive of much suffering. His pulse was small, weak, and rather quick. His nights were almost sleepless, and he was most anxious to have the leg off. Having determined on its removal, the next question was, at what part of the limb it should be removed. I was at first determined to take it off above the knee, and my reason for so doing was the danger of the tibia being diseased, or, the soft parts, from their proximity, taking on the diseased action. The arguments for operation below the knee were—the greater danger to life if removed above the knee; the patient's age; the healthy appearance of the parts below the knee; the apparent normal feel of the muscles; and that in this form of disease the bone becomes indurated with obliteration of its medullary canal.

Yielding to the supposed advantages, I, on the 21st of January, 1865, amputated below the knee by the usual flap operation. I then found the tibia in a state of disease, being extremely thin and brittle, and the medullary canal filled with a fluid resembling oil, which flowed freely. The posterior flap, or rather that part of it formed by the soleus muscle, was converted into a white, firm, elastic substance. A substance of like description surrounded the arteries, and it was found impossible to properly secure them. The veins were canalized, from being surrounded by a like substance. Finding the parts in so diseased a condition, I immediately performed the circular operation above the knee. The femur was found to be extremely dense in its structure, and cut like ivory. The vessels were easily secured, and, I am happy to say, so far all is going on well, two-thirds of the wound having united by the first intention. Any one looking at this ulcer will at once perceive its warty nature. The patient denies that there was ever a scar or cicatrix on his leg. Mr. Cæsar Hawkins states that this form of ulcer is only developed in cicatrices, yet in his second paper on the subject, published in 1841, he gives a case where he mentions "that there was some doubt whether the disease might not have originated in the bone, and ulcerated outwards into an old cicatrix, the disease then presenting the usual warty growth and fungous appearance of cancer of cicatrices; but if it were so, it equally shows that cancer of a cicatrix is possessed of certain characters in whatever way it begins, and that both the skin and the bone may be extensively destroyed by ulceration."

Here, then, we have a supposition of a cicatrix to carry out a theory. In a former paper, which I had the honour of reading before this Society, I ventured to express an opinion, that I did not believe the true pathology of the warty ulcer was as yet made out, and I still maintain the same opinion, as I have seen superficial ulcers with a warty appearance heal, and I have seen scirrhus when ulcerated take on a warty appearance, which again would be destroyed by phagedenic ulceration, and would reappear in scirrhus when the latter ceased.

Mr. Cæsar Hawkins believes this disease to be malignant, but malignant in the slightest degree. Prof. Smith, in his very able paper on the "Warty Ulcer of Marjolin," is of the same opinion, and he gives a case of secondary contamination occurring eight months after the removal of the morbid structure, and which proved rapidly fatal.

I also adhere to my former opinion, that the warty or fibrous ulcer is cancerous. However, all are agreed upon one point—viz., that it should be removed. The removal may be effected in either of two ways—by the knife or caustic; and if caustic be used, I believe chloride of zinc to be the best for the

purpose. As to the advantages or disadvantages of either method, I will not at present enter.

To those desirous of further information on this subject, I would refer them to Marjolin's paper on "Ulcer," in the *French Dictionary of Medical Science*; to Mr. Cæsar Hawkin's paper; to that of Prof. Smith; and to the communication I had the honour to lay before this Society on a former occasion.

Mr. Stapleton proceeded to say, that any one who looked at the bone which was on the table would see, that instead of being condensed, it had undergone what he would call a fatty degeneration, and on looking at the upper portion of the tibia they would see it was filled with a fluid resembling oil. The muscles were converted into a hard fibrous substance, and such was the extreme density and consolidated texture of the femur that the particles separated like ivory dust under the saw. He was happy to say the man was going on remarkably well. Two-thirds of the wound were healed. No bad symptoms had set in, and the patient expressed himself as being greatly relieved. His age was 50. As he had already observed, the specimen, though so recent, did not show the warty structure so conspicuously as before amputation.—*The Medical Press*, April 12, 1865.

33. *Prevention of Suppuration after Operations on Tumours.*—At the meeting of the Academy of Sciences, on November 28, M. Velpeau communicated a note from M. PÉTREQUIN, in which that surgeon advocated the application of tincture of iodine as a means of preventing suppuration after the removal of tumours; especially in situations such as the face and neck, where it is desirable to prevent the formation of cicatrices. Hitherto, M. Pétrequin observed, iodine has been applied with the view of modifying the suppurative process; but M. Pétrequin's object has been to prevent it altogether. He has, like M. Velpeau, many times observed that, in hydrocele, for instance, suppuration was less likely to follow the injection of tincture of iodine than of wine. He has never seen suppuration follow the injection of iodine into the parenchyma of organs, into glands, into the thyroid body, or into cavities; but, on the contrary, the formation of pus appears always to have been prevented.—*Gaz. Méd. de Paris*, Dec. 10, 1864.

34. *New Form of Fixed Bandage for Fractures.*—MR. CAMPBELL DE MORGAN extols (*Med. Times and Gaz.*, May 20, 1865) a simple mode of applying a firm apparatus, described by Dr. L. HAMON in the early numbers of the *Gazette Médicale de Paris* for the present year. Mr. De Morgan and his colleagues at the Middlesex Hospital have used it frequently.

"The material with which the bandage is stiffened is glue, and it should be prepared as follows: The best French glue should be used. It should be broken up and soaked in a little cold water for some hours, and then melted in the usual way in a glue pot, as little water being used as possible. It is not necessary to soak the glue in cold water, but if this is not done it will require the longer heating. When it is to be used, about a fifth part of its bulk of alcohol must be added—methylated spirit answers quite well. At first this converts a great part of the melted glue into a whitish coagulum, but by a little stirring it all liquefies, and is then fit for use. The alcohol is added to induce the rapid drying of the glue—which would otherwise remain soft for many hours, but when mixed with the spirit begins to get firm on the surface very soon after it is applied, and in a short time becomes tolerably firm throughout. It should be applied with a moderate sized flat hogs' bristle brush. Supposing that a simple fracture of the leg is to be treated, these are the steps to be taken:—

"The foot should be neatly and firmly bandaged from the toes to the ankle. Two or three streaks of glue along the sides and front will secure the bandage, so that it need not be again disturbed. The leg from the ankle to the knee should then be covered with a very thin layer of cotton wool—not the medicated wool, as it is called, but such as is procured in sheets for lining dresses. Of this a layer not more than the eighth of an inch in thickness can be easily stripped off, and smoothly applied to the leg. A cotton bandage should then be rolled very smoothly and with tolerable firmness up the leg from the ankle to the knee, and well painted over with the glue. Another bandage should then be placed

over the first, and the gluing process repeated. A third may then be applied and glued, and then a bandage should be put on over all, and the leg placed in position, and retained, if necessary, by sand bags or junks. Of course, if the surgeon please, he may apply strips of bandage, or of any linen or cotton material he may find at hand, instead of repeating the rolling process. The glue should be laid on freely, and brushed a little into the bandage. In some cases two layers of the glued bandage will be found sufficient. In others it may be desirable to give greater support; but this can always be done as an after-process. The leg should be left at rest for from twelve to twenty-four hours. The glued bandage must then be cut through its whole length. This may be done with the ordinary scissors used for the starched bandage, or a director may be insinuated beneath the bandage and cut upon with a sharp knife. If too long a time elapses before the bandage is cut through, it becomes so hard that great difficulty may be found in cutting it at all. When the bandage is thus slit up, so great is its elasticity that it may have its edges separated sufficiently to allow it to be easily slipped off the leg; and when left to itself it will resume its original shape, and this elasticity it will retain for as long as it is used. A strip not more than a quarter of an inch wide, and running the whole length of the bandage, should now be cut off from one edge, and holes punched out parallel to the edges on either side, and about half an inch from them; into these 'œillets' are to be inserted, such as are commonly used in laced bandages or boots.

"The punching and insertion of the œillets are rapidly done with the common instruments used for the purpose, which, with the œillets, can be had at any toolmaker's.

"The bandage is now complete. If it is thought desirable to strengthen it generally, or in any particular part, this may be done by gluing on fresh strips of linen. Its appearance may be improved by gluing on an edging of tape round the top and bottom, and along the sides of the slit. It is reapplied to the leg, and laced up as firmly as may be thought necessary. The lace, if it is not furnished with a tag, is best introduced on an eyed probe, and it should always be passed from without inwards. If the tag is introduced from within it always gets entangled in the cotton wool, and the process of lacing is extremely troublesome.

"Thus a case is formed which is completely moulded in the form of the limb, is very elastic, very firm, and very durable, and which can be accommodated with perfect ease to all the varying states of swelling of the limb.

"In situations where the roller cannot be conveniently carried round the part, the splint can be just as well formed by laying strips of linen in any direction and gluing them. The cotton wool of course adheres to the first layer of the bandage, and comes off when it is removed. It is applied in the first instance in great measure to keep the glue from contact with the skin.

"The great advantage of this splint is its union of firmness with elasticity. These qualities it retains undiminished for a great length of time. I have found no alteration in these respects during the many weeks that some patients have worn it; a patient now in the hospital has worn it for six weeks, and I find no change in either its firmness or elasticity. At any time it could, if required, be strengthened by a few strips of linen being glued on it.

"I have described it as applied to fracture of the leg, but it can be used in any situation where support is required. Thus I have used it in Pott's fracture, inclosing not only the leg, but the ankle and foot, and have found that it could be slipped on and off with the greatest ease. I have used it in fractured patella, after sprains to the knee and ankle-joints, in diseased knee-joint, and in case of diseased hip-joint encircling the pelvis and upper part of the thigh.

"Altogether this 'bandage gelatino alcoolisé lacé' appears to me to be one of the best as well as the most easily applied, and most convenient in its after use, of any of the modifications of Seutin's bandage which have as yet been tried, and it is well worth the notice of surgeons. The advantage which it possesses over others is in its elasticity, which permits of its being widely opened when slit up, without cracking or losing its form. Hence it can be applied as a laced bandage, and may be worn for weeks together, while the patient is moving about, without the trouble of readjustment; while it can be accommodated to any

change in the state of the limb, through increase of swelling or its diminution, by simply letting out the lace, or taking it in, without even removing the bandage. It is, moreover, very light, and yet strong enough for any purpose to which a splint can be applicable."

35. *Modification of Fixed Apparatus for Fractures.*—Prof. JOLLIFFE TUFNELL describes (*Dublin Quarterly Journ. of Med. Sci.*, Feb. 1865) a modification of the fixed apparatus which he has used both in hospital and private practice with great satisfaction.

"The material required," he says, "for forming these splints is very generally available, consisting only of lint or old linen for the inner lining; strips of the same, torn three inches in width, and long enough to reach from the head of the tibia to the sole of the foot. To make the splint itself: The white of eight eggs and half a pound of flour for the fixing substance. These are all that are required; each and every one of which is to be procured in almost the poorest home—and as such, this splint is readily available to the surgeon in country practice.

"The main feature of difference between this mode of setting fractures and every other kind of fixed apparatus, is the construction of the splint in two halves, and the applying of the bandage, which is to form the same lengthwise, instead of circularly, thus avoiding all possible sources of constriction of the limb.

"Supposing, then, that the fracture has occurred in a city, or wherever else the most desirable materials are to be procured, the surgeon sends for the following, and places them beside him before interfering with the patient, further than to strip him of his clothes and lay him upon a properly prepared bed, upon the side opposite to the fractured limb—the leg itself being supported easily on a pillow—and the fracture, as far as possible, reduced. The articles required are—a table for spreading the bandages upon, a wash-hand and small sharp-edged basin, eight eggs, and half a pound of flour, as before stated; a large iron or silver spoon, a large knife, three calico roller bandages, half a yard of Taylor's lint, and some hot water. The lint is first thrown upon the limb, from the knee to the sole of the foot, and cut roughly into the outline of the limb, of a size sufficient to tuck under the sole at the bottom, and from side to side of the leg.

"This lint is placed in the large basin, and hot water poured upon it, so as to saturate it completely, and whilst dripping, and without being wrung, it is lifted out and put upon the outer side of the limb of the patient who is lying with the leg bent, and exactly in the same position recommended by Pott, with this difference that the limb is on the inner instead of its outer side, by this measure insuring subsequent inversion instead of eversion of the foot. Extension and counter-extension are now made by the hands of two assistants, and the fracture set by the surgeon, who models the wet lint on to the limb with his hands, so that it is as closely applied as a stocking would be; any starting or spasm of the muscles is prevented by the assistants just laying their hands steadily upon the limb. The surgeon now breaks the eggs upon the sharp edge of the small basin, drops the yolks into it, and the albumen into the other, having first thrown out the hot water which was previously in it for wetting the lint; he then takes sufficient flour, according to the size of the eggs, and with the spoon beats it and the albumen into a homogeneous mass of the consistence of pancake. He next measures with the end of a roller the length of the limb, from the knee to the centre of the sole, and placing the forefinger of his left hand, pointing upwards, and the forefinger of an assistant opposite to him at the required distance, he winds the whole of the three roller bandages, one after the other, around the fingers, and then with a scissors divides them at either end; thus in a few moments obtaining the strips necessary for the splint, all of exactly the same and the proper length. Each of these tails is now spread thickly with the egg and flour upon one side, and as spread, folded double, with the plastered surfaces opposed and laid aside. The object of this is to keep them moist, and in hot weather from drying; as soon as they are all done the surgeon commences, and having them handed to him one by one, he lays them on the limb, moulding them to it, layer after layer, from the innermost portion of the tibia within to

the farthest point of the calf of the leg that can be reached behind, covering accurately the instep, the toes, sole and heel, and not leaving a wrinkle or crease. The large knife which has previously been employed for spreading the bandages with egg and flour, is now employed as a spatula, and taking a few of the tails of bandages which have been left unspread, these are passed beneath the limb, and one after the other brought around it (as shown by the dotted lines), so as to confine the wet tails to the leg, and not allow them to be raised from off it as they otherwise would be by the expansion of the heated air which becomes rarefied within.

"The limb is now *left uncovered* till next day; if covered, the splint will not dry, but retains a kind of pasty condition, whilst if exposed to the air for twenty-four hours it will be as firm and as light as cardboard on the limb. Upon the succeeding day the patient turns over upon his opposite hip, and the same proceeding is repeated exactly as before, taking care that the lint lining goes well over the limb, so as to be in advance everywhere of the plastered strips, which if allowed to come in contact with the other portion of the splint would intimately adhere to it, and cause difficulty in the separation of the halves; this too is allowed to dry. Upon the succeeding morning the two half splints, or only the second half, as the surgeon may think fit, are removed, the edges trimmed neatly with scissors, the second half overlapping the other by at least half an inch, insuring correctness, whilst all pinching of the integument is prevented; when the roller bandage is subsequently put on, the two portions of the splint, in fact, should glide, as it were, the one over the other. Nothing more remains to be done; a couple of fillets to confine them to the limb, or a lightly applied roller bandage are sufficient, and the patient may now lie in bed with his leg straight or bent, as he wishes, raised up upon a pillow, or slung, whichever way he fancies or feels it easiest; and after a few days may get up, supporting the extremity by a sling round his neck.

"Subsequently, when the patients come to exercise and move about, and the size of the limb to decrease, the splints may be brushed over inside with hot paste (as also around the edges), and a piece of chamois leather, previously cut to the size and shape, moulded in to form a softer and additional lining.

"These splints are very light, weighing, when dry, but a few ounces, yet from their extreme accuracy in fitting the limb, and evenness of pressure, most surprisingly strong.

"The same material I also employ in the immediate treatment of fracture of the fibula, and, at a later period, in fracture of the thigh, used in the circular form; put on, however, in tails, imbricated one over the other, and not as a roller bandage. Thus applied it is, of course, necessary to slit it up prior to removal, and for this purpose I employ a blunt gorget with the handle reversed, using it as an ordinary director, and cutting down upon the grooved steel with any sharp pointed knife. Seutin's pliers and all other kinds of scissors and dividers I have tried and found objectionable in use, causing more or less annoyance and pain to the patient from the pressure exercised upon the soft parts in making a division of the harder external case, whereas the gorget slips along upon the skin, whilst its broad, round, and polished surface is cut down upon without the slightest motion or pressure, and is not noticed hardly by the individual."

36. *Rare Variety of Inguinal Hernia (Cooper's Encysted Hernia of the Tunica Vaginalis).*—As the result of an elaborate investigation into the nature of this form of hernia, M. BOURQUET arrives at the following conclusions: 1. There is a variety of hernia characterized by the presence, within the tunica vaginalis of the testis, of an isolated and independent hernial sac. 2. This sac, entirely distinct from the tunica vaginalis, is formed by a diverticulum of the peritoneum, which becoming engaged within the superior orifice of the inguinal canal, afterwards projects within the cavity of the serous membrane of the testis. 3. The tunica vaginalis then presents a more or less considerable enlargement, and may become the seat of an accumulation of liquid, which coexists with the hernia. 4. The designation, "hernia with a double sac," or "hernia with intra-vaginal sac," would seem to be more appropriate, as giving a more exact idea of the nature of the affection than that of "encysted hernia of the tunica vagi-

nalis," bestowed upon it by Sir Astley Cooper. 5. The nature of this hernia is accidental, not congenital, and its mode of production, its symptomatology, its progress, and its anatomical characters, place it in the same category with ordinary inguinal hernia. 6. Strangulation may not only take place at the neck of the sac and the aponeurotic rings, but also much lower down, within the interior of the tunica vaginalis itself, through a laceration of that membrane. 7. The increased extent of the tunica vaginalis, and the presence of liquid in its interior, may lead the surgeon into error at the time of the operation for the strangulated hernia, causing the sac to be mistaken for the intestine, and leading to the belief that the sac has been opened, when the tunica vaginalis only has been entered. 8. In order to avoid this error, of which examples are recorded in the annals of surgery, the sac should be drawn out and cautiously opened either with the nails or by the bistoury.—*Brit. and For. Medico-Chir. Review*, April, 1865, from *Gaz. Hebdom.*, Nos. 44-50, 1864.

37. *Hydrocele of the Canal of Nuck.*—Dr. ALBERT WALSH brought under the notice of the Surgical Society of Ireland (March 24, 1865) the following case of this:—

Mary M. Dermot, an emaciated woman, who stated her age to be 46, was admitted into the Adelaide Hospital on the 18th of last January. She was then suffering under scirrhus of the right breast of 'eighteen months' standing, and was in almost the last stage of cancerous cachexia. The right arm was markedly œdematous, and shortly after her admission, the right leg became œdematous also. On exposing her groin for the purpose of showing the enlarged glands to the class, I observed a tumour occupying the position of the external abdominal ring. The patient's attention having been called to it, she at once stated, that she had never noticed it until the week before, when she felt it "among the other kernels." It was oval in shape, about the size of a small egg, and communicated a distinct sense of fluctuation. It was not influenced in any way by pressure or manipulation. It received no impulse upon coughing or straining, and was perfectly translucent when viewed by transmitted light. Under these circumstances I expressed my opinion that it was probably a hydrocele of the round ligament, and on the 4th of February proceeded to tap it with a fine trocar. I drew off about two ounces of a clear albuminous fluid resembling that contained in a hydrocele of the tunica vaginalis, when the tumour collapsed and entirely disappeared. The external puncture was then sealed up with collodion. The next day the patient complained of some pain in the part, the sac commenced to refill, and had almost regained its former size when she died, on the 11th of February.

I made a careful post-mortem examination forty-eight hours after death, when the œdema of the right extremities was fully accounted for, by the enlarged interthoracic and iliac glands. On raising a triangular flap of skin and dissecting down upon the tumour, I found it to be of a light-blue colour, completely filling up the external abdominal ring and extending along the inguinal canal, both pillars of the ring being clearly defined and distinctly separable from it by a probe. Below, the sac ended in a bulging extremity fully a quarter of an inch short of the termination of the posterior wall of the canal, and was attached throughout to the round ligament, which could be traced by itself some distance further down. On slitting up the ring the sac was seen to extend nearly half-way up the canal, and its entire dependence on the round ligament became apparent, traction on the ligament from within producing corresponding movement in the sac. The specimen, in fact, answered in every respect to the description given by Regnoli¹ of his third variety of hydrocele in woman—namely, "hydrocele of the canal of Nuck without communication with the peritoneum. On the extreme rarity of this form of hydrocele it is unnecessary to insist. So much is it the case, that not only do the ordinary text-books of Druitt, Erichsen, and Cooper completely ignore the subject, but even Chelius and Rokitsansky overlook it, while Paget merely informs his readers in a footnote of two lines that there *is* such a thing as hydrocele of the round ligament.

¹ Arch. Gén. de Méd., second series, vol. v. p. 114.

The disease, however, has been recognized by so early an observer as Aspasius; and Paré, Desault, and Lallemand in France, and Palletta and Sacchi in Italy, have each recorded a case of it. But it is to Regnoli that we owe almost all our information in the matter, and his researches have enabled him to arrange hydrocele in the female under five heads: first, œdema of the round ligament; second, hydrocele of the canal of Nuck communicating with the peritoneum; third, hydrocele of the canal of Nuck without communicating with the peritoneum; fourth, encysted hydrocele; and fifth, accumulation of serum in the sac of an old hernia, the neck of which has become obliterated. In spite of this, Velpeau "is convinced that the question needs further investigation," and has his "reasons for believing that several, if not all the tumours hitherto described as cases of hydrocele in women, consisted of nothing more than cysts of the labia majora or mons veneris." In defence of this position he urges, that the round ligament terminates on the posterior wall of the inguinal canal, and that in the cases described by the French surgeons the cyst lay between the ring and the labium. He alludes also to four cases which came under his own notice, in all of which he satisfied himself that the tumours were "accidental cysts, and not effusions into a primary peritoneal sac." In none of them, he says, had the tumour any relation or continuous connection either with the peritoneum or round ligament. An instance like the present, therefore, could never have fallen under the observation of Velpeau, for this perfectly comes up to his standard of the attributes which should be possessed by a genuine hydrocele. Here the sac is situated on the continuity of the round ligament, rather within than without the ring, and is, in addition, evidently connected with the peritoneum. In fact, his cases appear to have been just what he supposed them to be—that is, cysts of the mons veneris and labia majora. But Velpeau must not be misunderstood to deny the possibility of the existence of the hydrocele in question. He merely mentions that he has never seen an instance of a hydrocele situated above the end of the round ligament, and shows that, as nearly all the cases described as such were published before he and Thompson demonstrated that the ligamentum teres does not descend into the labium, it is highly probable they were simply cysts of the labia likewise. The present specimen is also curious in another respect. In every case with which Velpeau is acquainted, the tumour was perfectly opaque when viewed by transmitted light, while in this instance the sac was even more translucent than the ordinary hydrocele in the male, probably owing to the comparative thinness of the walls of the sac and of the contained fluid. The accompanying drawing by Connolly gives a very good idea of the appearance and position of the tumour before puncture.

Dr. Walsh added that Dr. Fleming had pointed out to him the report of a case which came under his notice some years ago in the Richmond Hospital. It was that of a woman who applied at the hospital to have a truss fitted, as she was told she had hernia. He (Dr. Walsh) was of opinion that this came under the fifth class described by Regnoli—that it had been a sac of old hernia, the neck of which had become obliterated, and into which there had been serous effusion.—*Medical Press*, May 3, 1865.

38. *Solvent Treatment of Urinary Calculi*.—Dr. ROBERTS communicated to the Royal Med. and Chir. Soc. (March 28) an experimental and clinical inquiry on this subject.

This paper was divided into two parts. The first part is devoted to experiments and observations relating to the solvent treatment of uric acid calculi by alkalizing the urine by internal medicines. The inquiry starts from two known data—namely: first, that uric acid is dissolved by solutions of the alkaline carbonates of a certain strength; and, secondly, that alkaline carbonates can be introduced into the urine, so as to render it alkaline, by the administration of certain salts by the mouth. The practicability of dissolving renal and vesical calculi, composed of uric acid, by alkalizing the urine, is inquired into under ten headings or sections as follows: Section 1. Comparison of solutions of carbonate of potash and carbonate of soda: in which it is shown that solutions of carbonate of potash are better solvents for uric acid than solutions of carbonate of soda. Section 2. Comparison of solutions of different

strength: in which it is shown that the greatest solvent power (for uric acid) lies in solutions containing from forty to sixty grains of carbonate to the imperial pint. Above this strength dissolution is soon prevented by the formation of a crust of biurate which invests the stone. Below this strength the solvent power gradually declines. Section 3. Comparison of the effects of varying volumes of solutions of constant strength.—It is shown that the quantity of the solution permitted to pass over the stone, between the limits necessarily imposed by the capacity of the kidneys to separate aqueous fluids, is of slight importance. A flow of three or six pints during twenty-four hours was found nearly as effective as a flow of eight or fifteen pints. Section 4. Absolute rate of dissolution of uric-acid calculi in solutions of the alkaline carbonates.—It is shown that solutions of carbonate of potash, of the maximum solvent power, when passed at the rate of from three to eight pints in the twenty-four hours over uric calculi, at the temperature of the body, dissolve from ten to twenty per cent. of the weight of the stone each day. Section 5. The most convenient way of alkalizing the urine, the degree of alkalescence which can be communicated to it, and the doses required to produce the desired effect.—The bicarbonate, acetate, and citrate of potash are found the most effective substances to alkalize the urine. Of the three the citrate is preferred. It is found that forty grains of citrate of potash dissolved in five ounces of water taken every two hours alkalizes the urine to a mean degree corresponding with the maximum solvent power of solutions of carbonate of potash. Section 7. The effect of alkalized urine or uric acid calculi.—The urine of a person taking full doses of citrate of potash, as recommended in Section 5, is passed over a uric acid calculus at blood heat. The stone (weighing 180 grains) loses weight at the rate of twelve grains and a half in the twenty-four hours. In the performance of experiments on this point it came out that if the urine became ammoniacal (from decomposition of urea) it ceased to dissolve the uric acid, and the stone became invested with a crust of precipitated phosphates. Whence the important deduction is drawn that ammoniacal decomposition of the urine in cases of vesical calculi puts an absolute bar to the effectiveness of the solvent treatment by alkaline carbonates. Section 7. Illustrations of the application of the solvent treatment in practice; first in renal calculi, secondly in vesical calculi.—Two cases of complete dissolution of uric acid calculi in the bladder are quoted from other authors. The author relates three cases which occurred in his own practice. In none of the latter did complete dissolution occur. One of the cases proved to be an example of mulberry calculus; another, an alternating calculus of uric acid and oxalate of lime. This second specimen offers peculiarities of surface which indicate with certainty that dissolution of the uric acid had taken place: these peculiarities are explained by the aid of drawings of the stone after extraction. The third case proved abortive apparently because the treatment was not carried on sufficiently long. In neither of the cases was the treatment carried out as effectively (as the later experience of the author showed) as it might have been. The principal instruction from the cases is, the proof they offered that alkalizing the urine does not cause the stone to be incrustated with a phosphatic deposit, so long as ammoniacal decomposition of the urine does not take place. Section 8. Discrimination of the cases in which the solvent treatment is and is not applicable.—The conclusions come to are: That the solvent treatment is inapplicable in all cases where the urine is ammoniacal. When the urine is acid (before treatment) the case is *primâ facia* suitable for the alkaline solvent treatment; but exceptions must be made of cases where it is known or strongly suspected that the stone is composed of oxalate of lime, also where the stone is large. In cases where the urine is acid, and there is no indication of the nature of the stone, it may be either uric acid or oxalate of lime, or an alternating calculus composed of these two substances. Such cases deserve a trial of the solvent treatment for a limited period of a month or six weeks. The cases which are especially suitable for the solvent treatment are those in which (the urine being preliminarily acid) it is known or strongly suspected that the stone is composed of uric acid, and has not yet reached any large size. Section 9. Directions for carrying out the solvent treatment effectually.—The urine must be kept continuously alkaline, and alkaline to a mean degree corresponding with

the maximum solvent powers of solutions of carbonate of potash. The treatment must be given up immediately if the urine become ammoniacal. Section 10. An examination of some of the objections which have been urged against the principles of the solvent treatment. The appendix to the first part contains some experiments showing that cystine is even more amenable to the alkaline solvent treatment than uric acid. The second part of the paper contains three sections. Section 1 contains experiments on the solvent treatment of uric acid calculi by injections into the bladder. Solutions of the following substances were tried in a manner to imitate injections into the living bladder: Bicarbonate and carbonate of potash, common phosphate of soda, basic phosphate of soda, borax, borax with liquor sodæ, potash soap, carbonate of lithia, liquor potassæ, and liquor sodæ. The results obtained demonstrated conclusively that their operation was so slow that no practical advantage could be obtained from their use. Section 2 records some experiments on the effects of a solution of carbonate of potash and dilute uric acid on oxalate of lime calculi: neither solvent promised any useful result. Section 3 shows the unsusceptibility of phosphatic calculi to solutions of the alkaline carbonates. Brodie's method of injecting dilute nitric acid into the bladder was imitated in one experiment, with results confirmatory of his statement respecting the use of this treatment in phosphatic concretions.—*Med. Times and Gaz.*, April 8, 1865.

39. *Description of the Mode of Treating Constitutional Syphilis by Syphilization; and its Results.*—Professor W. BOECK, M. D., of Christiania, describes (*British Medical Journal*, April 8, 1865) his process of syphilization and its results, as he conceives medical men in England are totally unacquainted with the proceeding.

Inoculation, he asserts, "is not entitled to the name of syphilization unless it be continued until the syphilitic matter will no longer take. It is necessary to continue inoculating as long as the virus has any visible effect on the system. Mr. Lee will, perhaps, answer that the virus never ceases to have a visible effect, for this assertion has been made by some; but I know for certain that it does, having myself observed such to be the case in every one of the seven or eight hundred patients whom I have had under treatment.

"The virus seldom loses its power on the system earlier than at the end of three months, and seldom later than at the end of four months and a half. However, after the lapse of some time, it will be possible, by inoculating with syphilitic matter, to produce on the patient a pustule or a sore; and in proportion to the time which has elapsed after syphilization, a greater or less number of pustules can be produced; but these pustules and sores are never so large, and it will never be possible to produce such a series of inoculations as take place during the first syphilization.

"With regard to the syphilitic virus, the body never returns to the state to which it was before syphilization. And here lies the turning-point or gist of the whole matter. Here we discover the striking analogy between syphilization and vaccination. From this point of view the matter must be considered; and when syphilization has been practised in strict conformity with this theory, the same astonishing results will be seen which for a long course of years I have been able to produce by this method. But people have not cared to consider the matter in this light. The French Academy knocked syphilization in the head without knowing practically anything about it; and everybody has blindly followed the French Academy. The whole affair has been considered as a chimera. What I am most surprised at is that practical Englishmen should have allowed themselves to be led away by mere words, instead of examining the hard facts for themselves.

"*Mode of Syphilization.*—In syphilizing I take matter from an indurated chancre and inoculate each side of the chest with three different punctures. After the lapse of three days I take matter from the pustules, which by that time have made their appearance, and inoculate the sides also with three different punctures on each side, always extracting matter from the last matured pustule for the next inoculation, until this matter no longer takes on the sides. I then extract matter from the sides, and in the same manner as before inoculate the

arms, where it again takes for a few successive times; and proceed in the same manner as before on the sides. When it ceases to have any effect on this part, I take the matter from another patient under treatment for syphilization. This matter will take for a few successive times; and with it I inoculate the sides of the chest and the arms at the same time. When this matter (from the other patient) loses its effect on these parts of the body, I transfer the matter from the arms to the thighs, where it again will take for a few successive times; and, when it no longer produces a satisfactory result, I introduce new matter extracted as before from another patient under treatment for syphilis with syphilization. I now continue on the thighs until the matter becomes inoperative. When the virus ceases to have any effect on the thighs, the patient will either be cured, or every symptom of the disease will in a short time vanish. One or two mucous tubercles will sometimes remain, or an exudation in the throat, etc., but these soon disappear on the application of caustics.

"With regard to the mode of inoculation, it is necessary to be careful to make every group of punctures at some distance from the one previously made; otherwise large confluent sores may result. I would likewise draw particular attention to the necessity of first inoculating on the sides, as chancres on this part of the body are seldom large, and have never, in the course of my experience, become phagedænic. If we begin with the thighs, the chancres will be large, and may possibly become phagedænic, and leave a bad cicatrix. If we finish with the thighs, susceptibility will to a great extent have ceased to exist, and the sores which then arise will neither be large nor deep.

"The different degrees of development which we observe chancres to reach on the different parts of the body, according to the part which has been first inoculated, must be the surest proof that syphilization does not only act locally, but also produces absorption into the system; and that the whole body is influenced by this treatment.

"Syphilization must be adopted in cases of *Constitutional Syphilis* only, it being often difficult or impossible to tell whether constitutional syphilis will follow a chancre; and syphilization ought to be adopted chiefly or only when mercury has not been previously given. Even after mercurial treatment, syphilization is certainly the best method that can be followed; but in that case there will not unfrequently be a relapse; and as long as the doctrine of syphilization meets with such strong opposition, the mercurial treatment previously adopted is liable to be forgotten, and the cause of the relapse to be assigned to syphilization. *In fact, syphilization must be the first method resorted to in constitutional syphilis, and not the last.*

"*Results of Syphilization.*—I will now state the results of syphilization as practised by me in my public ward in the hospital in Christiania. From October, 1852, to the end of February, 1865, there have been 502 patients subjected to the treatment of syphilization, of which number 429 had not been under mercurial treatment. Of this latter number, 384 were cured completely, and 45 have returned to the hospital with a relapse, 28 of whom were not subjected to any new constitutional treatment. In these, external remedies have been alone applied, and in the greatest number of cases only for a few days. Thirteen of the forty-five were resyphilized; and four of them were treated with iodide of potassium.

"Of the 429 there were 42 children suffering from hereditary syphilis. Many of these had atrophy; but I wished to see to what extent syphilization might be practised. Of these 42 children, 22 died. This may, perhaps, be considered a high rate of mortality; but whoever knows anything of the treatment of hereditary syphilis in new-born children will not find this result unsatisfactory. Moreover, of the aforesaid 429 individuals, one child, who was suffering from acquired syphilis, died of croup, and a woman, aged forty, of dysentery. The state of the patient's health after treatment has been most satisfactory. Apoplexy, paralysis, and the numerous internal affections, which are an every day occurrence after mercurial treatment, have never, as far as my experience goes, followed syphilization. Tertiary symptoms have been confined to slightly developed affections of the bones; and of these cases I have seen four.

"In my private practice I have had at least 250 persons under treatment, who,

whilst the treatment was proceeding, were able to transact their daily business. The results of syphilization in my private practice have been still better than in the hospital, these patients having been in easier circumstances. But as their case did not come under the observation of any one but myself, I will say no more regarding them.

"If the results of syphilization be compared with those of mercurial treatment, the difference will be found so extraordinary that the most zealous advocates of the latter must yield their opinion to the force of facts. There is, however, one point in which these two modes of treatment do not differ so widely; and that is, with respect to their several results upon the offspring.

"The effect of mercurial treatment on the offspring has long been known. It is acknowledged as a fact that, when the mother has been treated for syphilis with mercury, the first children have been either in a state of putrefaction, or still-born or syphilitic; and there is no certainty that she will ever give birth to healthy children. I have, however, shown, in my statistical work entitled *Recherches sur la Syphilis* (Christiania, 1862), that when a female patient has been treated for syphilis previously to the age of puberty, she almost always gives birth to healthy children. If a male patient have been treated for constitutional syphilis with mercury, his children will generally be healthy. With but very few exceptions, they will be free from the disease; and even with the exceptions, they will not have it in so high a degree as those born of a mother who has been syphilitic. With regard to syphilization the case is similar; but my experience, which on this subject is not trifling, would seem to justify the idea that the mother sooner begins to have healthy children after syphilization than when the parent has been subjected to mercurial treatment; and if a mother, after syphilization, has given birth to a healthy child, the children born afterwards will not be syphilitic, which they sometimes are after mercurial treatment.

"An attempt has been made to throw obstacles in the way of syphilization by pointing to its results where children are concerned, and alleging its inferiority in such cases to mercurial treatment. It has also been attempted to prove that so-called 'derivation' is not a cause of disease in the offspring; but this is not true, for the case is precisely the same after derivation as after syphilization.

"I have now given a brief description of syphilization as I practice it, and its results; and it would be indeed gratifying to me if its vast superiority over the mercurial system were to be recognized; and, if this is ever to be recognized anywhere, it must be by the most practical of all nations. With regard to syphilization, there are many trifling points to be noticed, in order that the different stages of the process may follow with regularity, and produce the desired result. By long experience I have learned that, wherever syphilization has been tried, it has been rejected on account of inability to surmount the small impediments connected with the system.

"It has been asked in what way syphilization acts on the system; and I must confess that I do not know. The results are plain enough; but how they are brought about I am unable to explain. But do we know more of vaccination and of many other great facts in the science of medicine? It is easy to construct a theory; and it would be strange if I had not formed one after having practised this method for nearly thirteen years; but it will make little difference to me if my theory should be proved a false one, for the facts will remain as strong as ever.

"I consider syphilis to be a disease which has to go through a certain cycle. We often see that it vanishes when left to take its own course; but we are unable to say how often at a later date it may return. I think that all I can say with certainty is, that relapses after the 'expectative method' are less frequent than after the use of mercury. I have shown, in my statistical work above referred to, that no treatment is followed by so many relapses, and gives generally such bad results as the mercurial. The reason of this, I believe to be very simple. Mercury interrupts the cycle which the disease has to pass through; it is not able to break out on the skin and the mucous membranes, and it consequently attacks other organs at a later period. By means of syphilization, syphilis is made to pass through an artificially produced cycle; the course of nature is not interrupted, but, on the other hand, assisted, and sometimes hastened.

"In the course of my practice, I have been compelled, by childbirth or some other illness, to stop syphilization; and, in such cases, relapses have often occurred. The cycle which has commenced is interrupted; and this, I believe, often happens when the disease is left to take its own course; for, during the time that the disease will have taken to pass through its several stages, many circumstances may arise to produce an injurious effect."

40. *Removal of Foreign Bodies from the Ear.*—M. GUERSANT, in a recent number of the *Bulletin Général de Thérapeutique*, makes the following remarks on this subject:—

If we except the concretions of cerumen that are principally met with in the aged and rarely amongst children, it must be said that foreign bodies in the external auditory canal are more often observed in youth than at more advanced ages. For our part, we have seen a considerable number of them in hospital and private practice.

The bodies thus met with are very diverse: hardened cerumen, pebbles, stones extracted from rings, or ear-rings, pearls, peas, shells, beans, fragments of glass-tubes, balls of paper, seeds, etc. Insects have been mentioned, but we have not on any occasion met with them.

All these foreign bodies, when they remain in the auditory canal, principally those which swell up, may occasion severe accidents: such as inflammation, suppuration, buzzing, cerebral symptoms, meningitis. Hence it is important to relieve, as soon as possible, children who have in their ears a pea, or a seed, which may swell up on becoming moist. The surgeon ought, before all, to ascertain with accuracy that a foreign body exists, because very dangerous attempts have often been made in cases where no such body has been present. If, after the patient has been placed in a proper position, and the light has been directed into the canal, the foreign body is recognized, the surgeon ought to act differently, according to the case.

1. The foreign body may be a fluid: such as water in swimmers, or oil. In these cases, a single shake given to the head has sufficed to make the fluid run out.

2. Sometimes there is hardened cerumen. A simple ear-pick, previously dipped in oil, will allow this concretion to be expelled. It may be necessary first to soften the cerumen by several injections of lukewarm water, or of oil or glycerine.

3. Peas, beans, seeds, or balls of paper swell and soften. They may be caught and hooked out sometimes easily enough, either with small forceps, or with a small short hook.

4. Hard bodies, as pebbles, shells, hard seeds, can be removed in several manners. As was very anciently advised, and as has been done by Menière, injections may be employed. We have, says M. Guersant, very often used these means, and for all sorts of foreign bodies. It is necessary, however, to act in a certain manner, with much perseverance; and the relations ought to be shown how to practise these injections, because it is often necessary to repeat them several days following before success is obtained. In order to apply injections, it is well to procure an Eguisier's irrigator, fitted with a straight tube and filled with cold, or better with luke-warm water. The child should be wrapped in a cloth, folded several times double, so that the arms are thus kept wrapped up; the cloth ought to surround the neck of the child, in order to avoid wetting it. The head should also be held in a somewhat inclined position, and a basin should be placed under to receive the water. The surgeon should direct the pipe of the irrigator into the auditory canal, propelling the jet of water very slowly at first, so that it may pass between the foreign body and the walls of the canal, strike on the membrane of the tympanum, and in its return drive out the foreign body, which will sometimes escape after the first injection. It is important that the surgeon, at the time of performing the irrigation, should draw the lobe of the ear alternately upwards, downwards, forwards, and backwards, in order to modify the direction of the jet. The operation should be repeated several days following, if no results follow the first injection; and the relatives should be instructed how to make the injections. M. Guersant has seen cases in which

the foreign body has only been removed after persevering for eight or ten days. When this means is not attended by success, the instruments which appear most likely to succeed are simple small forceps, which are always useful in cases of soft bodies, paper, lint, etc.; or better, the ordinary scoop or Leroy d'Etiolles' small scoop. In many cases, the instrument should be guided principally along the lower side of the canal. As the introduction of scoops is always more painful than the use of injections, and gives rise to more struggling on the part of children, M. Guersant observes that, when it is necessary to use this means, we should not hesitate to employ chloroform. When the child happens to be manageable, besides the inclined position of the head, M. Debout has recommended the mouth of the patient to be opened. It is sufficient to introduce the end of the little finger into the external auditory canal, and to make the lower jaws move in order to become convinced of the enlargement undergone by the canal each time the condyle of the jaw leaves the articular surface. This attitude facilitates the employment of all the preceding operations; but that which it aids most is the employment of injections.—*British Med. Jour.*, March 4, 1865.

OPHTHALMOLOGY.

41. *Epidemic Disease of the Eye now prevailing in Copenhagen.*—Dr. W. D. MOORE has translated for the *Medical Press*, from the *Ugeskrift for Læger*, an interesting sketch of this disease by C. WITHUSEN.

There were admitted into the Kommunehospital from the beginning of August of last year about 600 patients; the number had steadily increased until the third week in November, when no fewer than 53 cases were admitted, and 49 in the fourth week; from that time the number of cases somewhat diminished, the weekly average of admissions having since been about 20, besides the patients received into the children's department of the St. Anna Hospital, who are probably about as numerous or somewhat less. But, as to the intensity of the disease, the severity of the cases has increased in an alarming degree; on the one hand, many more adults have been admitted, in whom the disease has, on the whole, a much more serious character; on the other, there is a number of patients, in whom it is so malignant that it almost invariably proceeds to complete loss of the eye. While last year the cases presented at most but slight catarrhal conjunctivitis, only exceptionally proceeding to actual blennorrhœa, they are now very general and very dangerous; but besides there are many cases which, without being distinctly referable to the diphtheritic form, have something of that character, and are by no means behind it in danger. Thus the hospital last week received a family, of whom the mother had violent blennorrhœa with a perfectly fleshy chemosis, universal softening with prominence of the cornea, and two days later rupture of this membrane; the husband had on the right eye almost total infiltration of the cornea, and in both eyes blennorrhœa, with chemosis and considerable rigidity of the eyelids. Two children who accompanied them had violent blennorrhœa. Another example is a man, who came in with softening of both corneæ, and in whom, during an attack of delirium tremens, which supervened immediately after his admission, rendering any treatment almost impossible, rupture of the cornea and evacuation of a portion of the vitreous humour occurred at the end of forty-eight hours. His daughter, aged 5 years, had violent blennorrhœa of both eyes, with spots of infiltration of the corneæ, but is now out of danger. A woman came in with considerable blennorrhœa, and notwithstanding active and careful treatment, one eye is now perforated and the other is in great danger. I might mention many other cases where only one eye is attacked, but I will not weary the reader by prolonging this sad list. The hospital has hitherto been so fortunate that, with the exception of the woman last alluded to, none of the cases admitted in an early stage reached such a fearful pitch; where the eye was completely lost, it was on admission already doomed; but it is my conviction that if the

epidemic continues with the same intensity, the favourable conditions which the hospital still affords for treatment will soon be lost in the great overcrowding of its wards.

Prof. LEHMAN, in a letter dated 2d Feb., 1865, states that the disease had not at that time diminished, and that the recent cases are of a more dangerous character than the earlier ones.—*Medical Press*, April 19, 1865.

42. *Parsley as a Resolvent in Slight Inflammation of the Eye*.—Dr. NEHCOURT considers that parsley is an excellent resolvent in slight inflammations. He states (*Revue de Thérap. Méd.-Chirurg.*, June 1, 1865) that he has often employed a decoction of the leaves with benefit in recent inflammation of the eyes. He applies it by means of a compress wet with a tepid decoction of the leaves, renewed every hour. He states that he cured a labourer, who had been unable to work for eight days on account of acute conjunctivitis, in twenty-four hours by this means.

43. *Jacobson's Method of Extracting Cataract*.—JACOBSON, in a communication to the Heidelberg Ophthalmological Congress, referring to a pamphlet he had published on the subject, stated that during five years he had operated by his method on one hundred cases, two of which were lost from suppuration; that since that time, in a space of somewhat more than a year, he had operated on a further forty cases, with a loss of only one eye. He then dilated on the three principal peculiarities of his method.

1. *Chloroform is always given to complete narcotism*. The author stated that in about fifteen hundred cases in which chloroform had been administered, in a period of five years, on no one occasion had any signs of danger ever occurred. That vomiting exerts no deleterious influence, if, as soon as its advent becomes apparent, the eye is protected by a charpie compress. If the chloroform had been given to the full extent, no spasms of the ocular muscles or convulsions took place during the operation. Professor Jacobson cited a case, which gave rise to much merriment amongst the audience. He said he had given a man, eighty-three years of age, exactly sixteen ounces of chloroform, and that it was two hours and a half before he commenced his operation! He never gave less than three ounces, generally from six to eight ounces. This, as he justly termed it, "colossal tolerance" for chloroform he was not in a position to account for, unless, perhaps, from the large amount of spirituous liquors that were consumed in his part of Germany (Königsberg). He considered chloroform imperative when any spasm of the muscles of the eye or a fluid vitreous appeared probable.

2. *Jacobson always makes his flap in the boundary-line of the cornea and the sclerotic*, through a vascular structure therefore. To this he ascribed the rapid union of the edges of the wound he had obtained. A second advantage of this method of section was that in case of any retraction of the cornea occurring, this never extended to the line of incision, so that no separation of the edges of the wound took place.

3. *He removes that portion of the iris, after extracting the lens*, which appears to be most exposed to bruising by the exit of the lens. The unusually eccentric position of the line of incision of the flap renders it easy to remove the portion of iris up to its extreme ciliary border.

An animated discussion ensued on the entire question of the methods of extracting hard cataracts.

Arlt said Professor Jacobson's statistics were very remarkable; he himself had only succeeded in restoring vision to ninety per cent. of his patients, the minimum amount of vision being the power of finding their way about alone. He considered suppuration of the cornea a secondary condition supervening in iritis and irido-choroiditis. He saw no advantage in Jacobson's line of section, indeed considered it predisposed to prolapsus of the iris in cases in which iridectomy had not been performed. The size of the section must be regulated by that of the cataractous lens. Iridectomy should not be performed uselessly, for it causes ultimately a dazzling. But Arlt considered it advisable (1) in simple cataracts liable to their cortex rubbing off during extraction; (2) when the pupil did not properly dilate; (3) if the cataract was very hard, and the

section of insufficient size. In these cases the iridectomy should precede the opening the capsule. In the following ones it should succeed it: (1) If the iris has suffered much bruising by the exit of the lens; (2) if any cortical substance is left behind.

Rothmund considered iridectomy should not be unconditionally performed in extraction; he agreed with Arlt in its indications, and did it immediately after the section, contrary to the practice of Jacobson, who first extracted, excepting when any cortical parts of the cataract remained behind.

Arlt appended his experience as to the influence of portions of the cortex of the cataract being left in the anterior chamber. He was, from years' experience, convinced that the swelling-up of such cortical portions often led to the destruction of the eye, especially in over-matured and certain forms of fluid cataracts. If lens and capsule be enucleated in one, no suppuration need be feared.

Dor regretted Professor Jacobson had not more circumstantially given the exact amount of sight his patients had attained. He also wished some further explanations on the enormous doses of chloroform, the tolerance to which could not, at any rate in children, be explained by intemperance.

Jacobson stated circumstances had not permitted him yet to give the exact visual power his patients had attained for a sufficiently long period after the operation.

Sezokalsky testified to chloroform facilitating the operation of extraction. He had also remarked an increasing tolerance for chloroform.

V. Gräfe made the following remarks: In the vast majority of cases the cornea was the first to suffer, the iris and choroid secondarily; he had observed diffuse suppuration and annular abscess of the cornea in a case of irideremia. He protested against Arlt's dictum that no suppuration could ensue if the lens was enucleated with its capsule entire.

He believed that the systematic conjunction of iridectomy with extraction diminished slightly the number of lost eyes, but questioned whether this compensated for the general impairment of vision such patients experienced from the over-large pupil, which failed, as a less pupil would do, to correct, and, to a certain degree, to supplement those imperfections of vision necessary to an absence of all accommodating power. He practically found the enlarged pupil caused in the patients a want of power of exactly localizing their visual impressions.

He stated he was now occupied in analyzing the statistics of the acuteness of vision he had obtained in 1,600 flap-extractions. All he would now signalize was that the operation on the lastly-affected eye yielded by far the more favourable result. He considered certain over-mature cataracts especially dangerous to operate on, not so, as Arlt, however, cataracts with a fluid cortex as with a viscous one that adhered to the capsule. He considered the capsule-epithelium often contributed far more than any cortical *débris*, by its germination, to a disastrous result. He had, however, under certain circumstances, especially in unripe cataracts, preceded extraction by opening the capsule some time before.

Arlt said if the suppuration commenced, as v. Gräfe assumed, in the cornea, it could hardly be prevented, as it was, by compress-bandages, &c. However, what he wished particularly to impress was the danger of leaving any cortical parts of the lens behind. He did not attach so much importance to the general constitution of the patient as was usually done; for how was it that in a double extraction sometimes one eye turned out well whilst the other went wrong.

V. Gräfe adverted to cases in which suppuration of the cornea led to iridocyclitis, morbid changes in the vitreous, retina, &c., and thus the destruction of vision, without this result being directly induced by the corneal suppuration, which might have completely retrograded.

As regarded one eye doing well, the other badly, in a double operation, this might depend on the one being more diseased than the other; this view was borne out by the greater liability to a bad result of the eye which first became cataractous—a fact in itself pointing to the unequally morbid condition of the two eyes. He was satisfied of the importance of the influence of the general constitution of a patient on the result of an extraction.

Arlt said such differences in the two eyes as Professor v. Gräfe alluded to

were possible, but not yet proved. He would again protest against Professor Jacobson's assertion of the innocuity of cortical *débris* left behind after an extraction.

Ruete did not consider small portions of lens-cortex remaining of vital importance, but agreed on the danger of larger ones. He cited a case in which, after an operation for division, the lens-substance swelled up and produced violent symptoms, which entirely disappeared as soon as the pupil was dilated by atropia, to reappear again as the effects of the atropia went off.

Jacobson advised, in case of any residuary cortical fragments setting up irritation, the instillation of atropia every ten minutes. He agreed with v. Gräfe in the origination of purulent corneitis from the wound itself.—*The Ophthalmic Review*, April, 1865.

44. *Extraction of Cataract by a Spoon*.—Mr. CRITCHETT, in a communication to the Heidelberg Ophthalmological Congress, after adverting to the various causes of failure of the old flap-extraction, passed in review its various modern modifications. Jacobson's method he had practised successfully, but considered the necessary use of chloroform during its performance dangerous. Mooren's method he had never tried. He had done Schuft's (Waldau's) operation more than eighty times, and preferred it to all others. Notwithstanding this, it was open to grave objections. These he had endeavoured to meet, and principally so by modifying the form of Schuft's spoon, for a description of which he referred to the *Lancet*, i. 24. He had performed Schuft's operation with his (Critchett's) spoon upwards of one hundred times, and prophesied that it would ere long completely replace the old flap-operation.—*The Ophthalmic Review*, April, 1865.

45. *Treatment of Cataract*.—Dr. KNAPP is convinced that no one method is adapted for all cases, and that the surgeon will gain the greatest success by careful selection of the operation to be employed in each patient. The following operations were performed during the year:—

		Result		
		Good.	moderate.	Bad.
Flap extraction	29	22	2	5
Linear “	11	10	0	1
Extraction of capsular remnants	2	2	0	0
Removal of a wounded lens	1	1	0	0
Discision	15	15	0	0
Reclination	2	2	0	0
	60	52	2	6

Thus the results were generally very good, the only exception being in regard to extraction by the flap-incision. The following was the most mournful case of the whole year: An old woman was admitted who had been blind for five years, and who had been both poor and neglected. When admitted, she was in a state of perfect misery and exhaustion. Shortly afterwards the operation was performed on one eye; there was no accident, yet the globe suppurated. By way of precaution, an artificial pupil was formed in the other eye, the lens being extracted four weeks later. There was no difficulty in the operation, and immediately after it the sight was good. Yet, almost without pain, the corneal flap perished.

Much as the needle has got into discredit in comparison with extraction, yet there are patients whose powers are so much impaired that a large corneal incision cannot be expected to heal. Impressed by the case just related, Dr. Knapp operated on a woman, aged 72, who was in a similar miserable condition, extracting a perfectly mature cataract from the one eye, and depressing the lens in the other. Although iridectomy had been previously performed, and the operation itself was perfectly successful, the extraction failed, whilst the other eye was saved. Both operations were performed at the same time, and when the woman was discharged she could see well with the one eye. Old age, *per se*, does not contraindicate extraction; it is the loss of reparative power that ren-

ders the prognosis unfavourable. Take, for example, the two following cases on which the operation was performed at the same time. The one was a woman of 72, with a very withered skin and weak constitution; the other a woman of 75, but healthy, vigorous, and lively; both came from Mannheim. On the latter, Dr. Knapp felt no hesitation in extracting without any preparatory treatment; the wound healed without the least symptom of irritation, so that in fourteen days she was discharged with good vision. In the other case he depressed the lens. During the next few days there were pains in the eye and forehead, and the globe felt very decidedly hard; glaucomatous inflammation was evidently commencing. Ophthalmoscopic examination on the day following the operation showed that the lens was at the bottom of the vitreous; the media were clear; the optic disk could be seen with perfect distinctness; no pathological change was found, yet the arteries began to pulsate when the eye was gently compressed. Dr. Knapp applied atropia, and remarked to the pupils that he would perform iridectomy if the glaucomatous inflammation increased, or even if it should persist. The examination with the ophthalmoscope did not cause the least pain. Next day the eye was in the same state; on the third the inflammation began to diminish, and in five days the eye was as soft as the other and free from all symptoms. Vision remained good throughout this period. It has, for the six months which have since elapsed, been quite satisfactory. As to the two other unfortunate cases, one eye was lost from purulent inflammation, and the other from internal hemorrhage which occurred during an attack of coughing six hours after the operation; the latter had been quite free from any mishap.—*The Ophthalmic Review*, April, 1865, from *Zweiter Jahresbericht üb. d. Augenheilstalt zu Heidelberg*, 1863–64.

46. *Cataract Operations*.—C. ROSSANDER states that the results of extraction at the Great Seraphim Hospital have been by no means satisfactory; indeed, scarcely 54 per cent. were successful. During the last ten years extraction was performed 168 times at this hospital: in 90 of these cases the result was good, in 20 it was tolerable, in 58 unsuccessful (that is, in upwards of a third). Seventy-seven patients were men and 91 women. As to their ages, there were between

10 and 20 years	.	.	.	.	.	.	2
20 " 30 "	.	.	.	.	.	.	11
30 " 40 "	.	.	.	.	.	.	14
40 " 50 "	.	.	.	.	.	.	13
50 " 60 "	.	.	.	.	.	.	37
60 " 70 "	.	.	.	.	.	.	71
Over 70 "	.	.	.	.	.	.	20

Cataract appears to be far less common in Sweden than in Germany, England, or Switzerland. Rossander calculates that in the whole of Sweden, out of a population of four millions, 45 to 50 cataracts are submitted each year to operation.

The author is much in favour of iridectomy as a preparatory step to extraction; he follows the method of Mooren, extracting two to four weeks after the operation for artificial pupil. Out of seven cases treated in this way, the result was in 5 excellent, in 1 moderate, and in 1 the globe suppurated.

In respect to linear extraction and its modified forms, the author holds the same views as von Graefe. Ordinary linear extraction was performed eight times during the last ten years at the Seraphim Hospital; the result was thrice very good, twice moderate, and thrice bad. Linear extraction with iridectomy was twice used; the result was once good and once bad. The author speaks very unfavourably of Schuft's method.

After discussing the various operations in use, Rossander proposes a new mode, which he calls a *modified flap-extraction*. He describes it to the following effect: It is absurd to attempt the extraction of a hard lens through an incision which is absolutely too small, or which necessitates the use of spoons. The question then arises, how large must the corneal incision be to allow the passage of a hard cataract? If in an ordinary extraction we raise the flap formed by half the cornea, or if we try the experiment on a dead eye, we shall find that the aperture will permit the point of the little finger to be introduced into the eye,

and that it is certainly far larger than is necessary for the exit of a body such as the lens. Why then make such an enormous wound when a less one will suffice, and is far less dangerous? The usual method was introduced in order that the lens might pass readily through the pupil; if, however, the iris is previously excised, the flap need not be larger than is absolutely required for the passage of the lens. A flap with a base four lines in diameter is quite sufficient; the difference between this and the ordinary one is far greater than would at first be imagined. Represent the cornea by a circle five lines in diameter, the base of the flap by a cord four lines long, and parallel to the latter draw through the centre a diameter; it will be found that the cord is not half way between the vertex of the arc and the diameter. Owing to the thickness of the cornea, the cord should in practice be placed a little further; the base of the flap should pass midway between the centre and edge of the cornea. The superficial area of such a flap is not half that of the usual one.¹

These are not mere theoretical speculations. The operation has been performed in seven cases, the cataracts being in six large and hard. In five the lens escaped without difficulty; in the remaining two the spoon had to be employed, not because the aperture was too small, but because fluid vitreous appeared before any pressure was applied. One eye only out of the seven was lost.

The great advantage of this proceeding is the smallness of the flap, which keeps in as good apposition, and promises as favourable union, as the wound formed in the ordinary linear operation.—*Ophthalmic Review*, Jan. 1865, from *Med. Arch. Stockholm*; *Klin. Monatsbl. für Augenh.*, 1864.

MIDWIFERY.

47. *Face Presentation in the Mento-Posterior Position.*—Dr. J. BRAXTON HICKS read (March 8, 1865) before the Obstetrical Society of London an account of two cases of this, with remarks. He began by pointing out that *a priori* there was no anatomical reason which rendered it absolutely impossible that spontaneous delivery should be effected with the chin posterior in face presentation, even within the range of normal pelvis and head, as represented by some authors. Quotations from the works of nearly all the English authors were given to show the variety of opinions upon the subject. Smellie's case delivered by the forceps was recited, with his opinions and advice upon the treatment of such cases. Two cases given by Prof. Braun were quoted, in one of which the fœtus was delivered by the natural powers, and in the other by the forceps, the chin coming over the perineum first. The author supplied another case in which, after ineffectual efforts to alter the position, he delivered the child alive by the forceps, without any detriment to the mother. The chin appeared first, coming over the perineum. The child was large and the pelvis normal. He also gave another case, where the face descended partly exterior to vulva so readily that, although the chin made the anterior rotation at the last moment, it seemed highly probable that it could have been born by natural powers had rotation been difficult. The state of our knowledge of face presentation was then summed up as follows: That although in the majority of cases the chin rotates forward during the descent in face presentation, whatever was the position it occupied originally, yet in some rare cases the chin passes through the outlet obliquely, while in others the rotation cannot be accomplished at all, either by nature or art. Under these circumstances, in some very rare instances delivery takes place spontaneously, though the greater number of this rare class require the use of the forceps, by means of which either the chin over the peri-

¹ It must not be forgotten that the diameter of the cornea varies considerably, and that in many cases it does not exceed four lines; in the latter event, Rossander's incision would not differ from the ordinary one.—T. W.

neum, or the vertex beneath the arch of the pubis, might appear first. The author thought, from a consideration of the foregoing cases of Smellie, Braun, and his own, in all of which the children were born alive, that provided the chin could not be brought anteriorly, then the head should be brought down in the most practicable mode, chin or occiput first, and not necessarily with the occiput first, as recommended by Smellie.

The President, Dr. BARNES, signalized the value of this memoir as tending to give precision to, and extend our knowledge of, labour with face presentation. His own experience had proved to him that such labours were not so uniformly favourable as was commonly taught. Difficulty might occur at two stages: 1. At the brim; in this case he deprecated the forceps and craniotomy, and recommended turning as giving the child the best chance. 2. In the pelvis; difficulty might arise here in the way indicated in the paper—viz., from the head retaining the position in which it entered the cavity. The proper rotation depended upon a due relation between the head of a live child, or one recently dead, and the pelvis. In Dr. Hicks's case the child was alive; it was, therefore, probable that the pelvis was large in proportion. In such a case he should not despair of turning if art or nature failed to rotate the chin. In cases of due relation of pelvis and child, birth with the chin posteriorly was almost impossible; for in proportion as the face descended, there was a rapidly widening base of a wedge, formed by the occiput bent back upon the child's trunk, which could not pass the pelvis.—*Med. Times and Gaz.*, May 20, 1865.

48. *Entrance of Air into the Uterine Veins.*—Dr. OLSHAUSEN relates a fatal case of entry of air into the uterine veins. A secundipara of robust frame, aged twenty-nine, was at term. The uterus was unusually distended; no albumen in urine. Labour lingering; uterine douche used. The water was of 30° Réaumur; it was forced into the vagina by a pump, gently. A third injection was made by a midwife. After eight minutes' use the patient began to complain of oppression. The tube was withdrawn. The patient rose in bed, immediately fell back senseless, and died in a minute at most, under convulsive respiratory movements and distortions of the face. Eight minutes later bleeding by the median vein was tried, but only a few drops flowed. On touching the body, distinct and widely-spread crepitation was felt.

Autopsy, eight hours after death.—A large quantity of dark fluid blood escaped from the sinuses of the dura mater. The cerebral membranes very hyperæmic; brain normal; lungs somewhat congested; heart lying transversely, apex in fourth intercostal space. Left ventricle in firm contraction; right quite soft, something like an intestine with thick walls; the coronary vessels contained a quantity of air-bubbles. Left heart had scarcely any blood; the right held little, but it was frothy. *Abdomen*: The distended uterus crepitated everywhere on pressure under the hand. A number of vessels of medium calibre immediately under the peritoneum were plainly filled with air. The right broad ligament was strongly distended with air-bubbles; and this emphysema of cellular tissue extended from the broad ligament through the retro-peritoneal space to the inner side of the right kidney, and even below the liver to the vena cava ascendens. *The vena cava ascendens was enormously distended*—it was at least an inch in diameter. The distension was mainly owing to air. The uterus was divided in the median line. A placenta was attached to the anterior wall; a small flap to the right was detached from the uterus. Another placenta was attached behind and to the right. A larger portion of this had been separated, so that there was a sort of pouch between it and the uterine wall. The two ova were uninjured. Death was caused by forcing air into the vessels of the placental-site. It was concluded that the tube had been passed into the uterine cavity, and that air had been sucked up with the water by the pump.—*Brit. and For. Medico-Chir. Review*, April, 1865, from *Monatsschr. f. Geburtsh.*, January, 1865.

49. *Continuance of Life of the Fœtus after the Mother's Death.*—Prof. BRESLAU has attempted to solve the question, How long can the fœtus live after the mother's death? by means of experiments on the lower animals. He details and tabulates twenty experiments, the greater number being performed upon

Guinea-pigs. The following conclusions are drawn: 1. The life of the fœtus always endures with a certain independence after the mother's death. 2. The life of the fœtus in the dead mother is very quickly in great danger, which reveals itself in strong convulsive movements. 3. "Apparent death," into which the fœtus commonly falls in the first minute after the mother's death, may be continued in the uterus in extreme cases as long as eight minutes; but mostly death occurs much earlier. 4. The fœtuses removed "apparently dead," from the body of the dead, are nearer to death than to life, for they do not recover by themselves, but quickly, almost without exception, perish. 5. Only seldom, and in the most favourable case, will the young be removed alive within five minutes after the mother's death. Even in the third minute the probability of extracting a live fœtus is very small. 6. If we operate later than five minutes, we cannot extract a living fœtus; if we operate later than eight minutes after the mother's death, not even an "apparently dead" fœtus can be extracted; the young are by that time dead. 7. The mode of death of the mother seems not to be without influence upon the life and death of the fœtus. Death by asphyxia is unfavourable to the fœtus; death by hemorrhage more favourable, so also death by chloroform, and by paralysis of the nerve-centres. 8. It appears to be of consequence for the persistence of life whether the fœtus be mature or immature, but the experiments could not determine this matter. With regard to the applications to the human fœtus and to practical obstetrics, Dr. Breslau submits that: 1. There is no doubt that the human fœtus, like the brute, always survives its mother when the mode of death is rapid and violent, as from bleeding, blows on the head, apoplexy, etc. 2. Daily experience shows that the power of resistance of the human fœtus is greater than that of the brute. 3. The duty of every physician is, after the ascertained death of the mother, to perform the Cæsarean section as quickly as possible, in order to save the child's life. The Cæsarean section may, however, be avoided when the previous death of the fœtus is certain, or when the fœtus may more readily be delivered by the natural passages. 4. The Cæsarean section will give no prospect of a living or of an "apparently dead" child, if not performed within the first fifteen or twenty minutes after the mother's death. 5. If the mother have died from disease, as from cholera, typhus, puerperal fever either during pregnancy or labour, scarlatina, smallpox, etc., there is no hope of saving the child's life. The same will be the case in those poisonings of the mother which effect a rapid decomposition of the blood, and which affect the child, as by hydrocyanic acid. Chloroform-death appears to be an exception, since chloroform, as such, does not pass into the fœtal circulation, of which one may be convinced by any labour completed under chloroform-narcosis. In the discussion upon the memoir in the Berlin Obstetrical Society, Professor Martin observed that in none of the four cases in which he had performed Cæsarean section after the mother's death was a living child extracted. In one the operation was completed within ten minutes; in one it was done "very soon;" in the remaining two it was done within half an hour. Dr. Boehr referred to a collection in *Caspar's Wochenschrift*, in which out of 147 cases only three instances of living children occurred. —*Brit. and Foreign Medico-Chir. Review*, Jan. 1865.

50. *Action of Ergot of Rye on the Fœtus*.—Dr. M'CLINTOCK read an interesting paper on this subject before the Dublin Obstetrical Society. He maintains that the administration of ergot in the second stage of labour is very apt to be followed by injurious and even fatal effects to the fœtus, and this he ascribes to the violent uterine contractions which the article excites, and which produces an injurious mechanical action on the fœtus.

Dr. M. C. says, 1st, as a general rule, "the danger to the child of giving ergot is exactly in proportion to the energy of the uterine contractions; 2d, where but little uterine action is excited by the ergot it does not seem to exercise a noxious influence on the fœtus; 3d, the evidence that ergot is acting injuriously on the child is derived from the cardiac signs, which become reduced in strength and frequency; 4th, the immediate effect of uterine contraction on the fœtal pulse is to produce a temporary diminution of its force and rapidity; 5th, in the few cases I have seen where violent and continued uterine action took place

from natural causes the foetal pulse underwent the same changes as after ergot, and the children were born in a highly congested state, dead, or partially asphyxiated, unless delivered soon after the accession of the tetanic contractions of the uterus.

"Of course, it remains for future observation to corroborate or invalidate the facts I have adduced, but assuming them to be correct and well grounded, I think it will be hard to avoid the conclusion, that the action of ergot on the foetus is due to the uterine contractions excited by the medicine. Let me here digress for a moment. I have had occasion to speak of certain changes in the character of the foetal heart sounds, and to remark that in one class of cases slowness, weakness, and irregularity are the precursors of the child's death, whilst in other cases on the contrary (not ergot cases, however), extreme frequency and weakness are found to precede the fatal event. Now, the mode or cause of death might account for these differences. I am not now speaking exclusively of cases of ergotic or tetanic labour, I speak of all cases. In cases where ergot has been administered, or where tetanic action was present, the foetal heart is depressed, and the pulsation slower and feebler; but in other cases, in cases of tedious labour, I found that as the child gets weaker the foetal heart usually gets more frequent and more rapid until it is almost impossible to reckon its pulsations. The subject, however, is one in every way worthy of being closely investigated, and I would recommend it to some of my junior brethren who have opportunities for prosecuting such an inquiry. If it has no other it will, at least, have this beneficial result, the advantage of which they will find very soon, it will make them quick at discovering the foetal heart's sounds, and the inquiry will thus bring its own reward with it.

"An interesting question now presents itself to us: How do the uterine contractions operate upon the foetus? There are three ways, I believe, in which the condition of the foetus may be affected by the pains: 1st. The umbilical cord may be subjected to direct pressure from the contracting uterus, and if this pressure be so great as to completely stop the circulation through the funis, the death of the foetus certainly and speedily ensues. This, I believe, very seldom occurs except where the cord prolapses through the os. In other cases, where the cord is pressed upon, this is owing to its being on some projecting part of the child, and the pressure then is only exerted temporarily—viz., during the presence of each pain; 2dly, the compression which the brain and medulla oblongata undergo where the head is wedged or impacted in the pelvis, has been deemed sufficient to endanger or destroy the life of the child, and by some writers this is supposed to be the way in which the child is destroyed after the administration of ergot—compression exerted upon the centres of the nervous system.

"It is very remarkable, no doubt, how great a change of configuration the head of the foetus may bear consistently with the preservation of its life; but in these cases the change in shape has been slowly and gradually effected, whereas in the case under consideration, compression being produced by strong, violent, and continuous uterine action, the change must, if it takes place at all, be effected quickly, and, so to speak, under high pressure. It is, however, only when there is resistance from the bony structures that pressure on the head can be really dangerous to the child, and therefore I believe pressure alone is very rarely a cause of foetal death. If what I have just stated be true, it furnishes us with an instance of the occasional antagonism of maternal and foetal interests. It is desirable for the mother, as Dr. Simpson has very ably shown, that the pressure of the head upon the soft lining of the pelvis should be as transient as possible, but for the child it is desirable that the compression of the head by the pelvis should be slowly and gradually made. Lastly, persistent uterine contraction may affect the child by causing imperfect oxidation of the blood in the embryonic placenta. There are the strongest anatomical and physiological reasons for supposing that the current of blood through the cells of the placenta is checked, if not stopped, during uterine contraction, so that the change from venous to arterial blood in the vessels is thus arrested, or imperfectly performed, just as the current of blood in the pulmonary vessels of air-breathing animals, or in the bronchial vessels of fish, is stopped when the needful supply of air or water is withheld. We can, therefore, have no difficulty in understanding how

pains of a violent kind, at short intervals, or succeeding each other without intermission, can operate prejudicially on the fœtus, nor why the child, when born under these circumstances, so commonly presents a congested livid appearance, and is so apt to be expelled in an asphyxiated condition."—*The Medical Press*, April 19, 1865.

51. *Extra-uterine Pregnancy in a Woman who had undergone Cæsarean Section*.—In 1863, Dr. HILLMANN, of Bonn, performed the Cæsarean section on Frau K., who had all the symptoms of progressive mollities ossium. In February, 1864, being in the eighth month of her pregnancy, she fell against a hard article of furniture; after which the fœtal movements were no longer felt. In the night of February 12th, labour-pains set in, with discharge from the vagina. On attempting to make a digital examination, Dr. Hillmann found that, on account of the narrowness of the space between the rami of the pubic bones, he could introduce his finger no further than the vaginal entrance; the os uteri could not be reached. He thought it possible that rupture of the uterus might have occurred, with escape of the child into the abdominal cavity; but the general symptoms which should denote such an occurrence were absent, and the labour-pains continued, although feebly. The fœtal heart sounds and movements could not be perceived. The labour-pains gradually ceased; and Dr. Hillmann waited, but in vain, for their reappearance as an indication for further operative proceedings. In eight days, the external enlargement of the abdomen, especially in the ileo-cæcal region, assumed an erythematous appearance; the part was tender to the touch, and felt as if there were œdema of the subcutaneous areolar tissue. At the same time, febrile symptoms appeared; and, as the epidermis desquamated, the patient had occasional sanguineous discharges from the bowels, which required the use of strong injections of acetate of lead to arrest them. On February 27th, an abscess appeared between the umbilicus and symphysis pubis. It broke, and discharged a quantity of fetid liquor amnii. On introducing the finger, Dr. Hillmann felt the body of the fœtus immediately behind the abdominal wall. Subsequently, the right hip of the child, denuded of its epidermis, presented at the opening, and was removed by Dr. Hillmann. Fearing that the continued pressure on the abdominal walls might lead to their laceration, he, after the bladder had been spontaneously emptied, extended the abscess-opening upwards and downwards for about six inches. The child was found entwined by the umbilical cord; it was a male of about a month less than full term, and was dead and putrid. The placenta was found attached in a space between the abdominal wall and the anterior part of the uterus; it was removed with some difficulty, but without hemorrhage. There were no fœtal membranes attached to the placenta, and none had been discharged from the vagina; Dr. Hillmann puts it as a physiological question whether the serous membrane of the abdomen may not have discharged the duty of the membranes. The wound was closed and dressed with infusion of chamomile. The progress of the patient was satisfactory; on March 8th, she was able to leave her room for the first time, and in six weeks the catamenia appeared, and afterwards returned at regular intervals of three weeks. On examination of the abdomen in September, the cicatrices of the two incisions were seen crossing each other at a very acute angle. In that left by the first Cæsarean section, the tissue had given way, so as to produce a hernia. On making a vaginal examination in the middle of October, and gently pressing on the hypogastric region, the anterior lip of the uterus could be felt. The patient was in as good health as could be expected in the circumstances.—*Brit. Med. Journ.*, Feb. 25, 1865, from *Berliner Klinische Wochenschr.*, Nov. 21, 1864.

52. *Puerperal Fever*.—Dr. T. SNOW BECK read a paper on this subject before the Obstetrical Society of London, Feb. 1, 1865. He related minutely the case of a young lady, aged 24 years, who was confined of her first child, presented symptoms of puerperal fever on the second day, and sank three days afterwards, or on the fifth day after her confinement. He pointed out that the leading feature in the case was the absence of that contractile power of the uterus necessary to the expulsion of the child and provide for the safety of the mother

after its birth, this being apparent at each stage of the labour—the languid contractions of the uterus, the inability to increase the force of these contractions by the usual agents, the requirement for the use of the forceps, the necessity for the removal of the placenta, the hemorrhage which followed, the existence of a large flabby open uterus when the hand was introduced, the great difficulty to induce sufficient contraction of the organ to prevent further hemorrhage, and the impossibility to procure a firm persistent contraction after the cessation of the hemorrhage. This lax condition of the uterus permitted the uterine sinuses to remain pervious, and arose from the absence of that due contraction of the muscular tissue which is essential to prevent any fluids circulating along their canals. Another case of puerperal fever was given, which also occurred in a healthy young woman, after apparently a perfectly natural labour, and which proved fatal on the ninth day. The body was examined thirty-six hours after death, and copious effusion of fluid into the abdomen, with shreds of soft friable recent lymph, and some injection of the peritoneum, were found. The uterus was large, pear-shaped, even on the surface, soft, and rather flabby; its interior was everywhere covered by a soft membrane, which presented the usual microscopic characters of the mucous membrane, and was covered by a red mucous secretion. All the tissues of the uterus were examined, and found to be perfectly healthy: no appearance of inflammatory product presented itself in any part of the organ. But the uterine sinuses were open, and water thrown into the larger veins of the abdomen readily traversed these canals, and escaped at the open orifices on the surface of the uterus. From the careful examination of these cases, the following deductions were drawn: 1. The phenomena of puerperal fever may be produced by the introduction of poisonous fluids into the general system. 2. The uterine sinuses remaining pervious to the flow of fluids would afford a means by which the poisonous fluid or fluids would enter the system. 3. The pervious condition of the sinuses remained in consequence of the absence of that firm and persistent contraction of the uterus after childbirth which appears necessary to effectually close these canals, and prevent all circulation of fluid along them. 4. The secretion from the interior of the uterus was probably sufficient, when mixed with the blood, to induce the effects observed. And it would further follow that—5—the various phenomena observed in puerperal fever may arise from this cause, modified infinitely by many incidental states; and the various inflammatory actions and products observed in the course of the disease would not be the essential parts of the disease, but morbid phenomena which occurred during the course of it. 6. The primary, though not the only, object in the prevention of these attacks of puerperal fever will then be to procure a firm, complete, and persistent contraction of the uterus after the birth of the child, and thus effectually to shut off all circulation within the vessels of this organ. The author considered that these cases gave a decided negative to the opinions that puerperal fever was caused by uterine phlebitis, lymphangitis, endometritis, metritis, or any similar inflammatory condition of the uterine organs, as no product of inflammation was anywhere discovered after a careful and even microscopic examination. The results were also opposed to the opinion of Cruveilhier, who compared the internal surface to a vast solution of continuity, and the gaping orifices of the sinuses to the open-mouthed vessels of an amputated limb. For here the internal surface of the organ was everywhere covered by a soft membrane containing all the elements of the mucous membrane, and covered by a red mucous secretion; whilst the gaping sinuses could only be compared to the open-mouthed vessels of an amputated limb when the uterine sinuses were pervious and admitted fluids to circulate within them: the real point of comparison not being the open orifices, but the open canals leading from these into the veins of the general system. The comparison between puerperal fever and surgical fever was also founded on an erroneous basis; for again a natural condition of the vessels of an amputated limb was compared with an unnatural state of the vessels of the uterus, which ought not to be, and might in the majority of cases be prevented. The propositions given by Dr. R. Ferguson in his valuable essay on Puerperal Fever were examined. The author differed essentially from Dr. Ferguson on the causes of the vitiation of the blood and on the varieties of puerperal fever. The effect of this noxious

impregnation of the general system was next considered, and it was shown that the quantity modified the result in a most singular way—a small quantity being eliminated by intestinal or urinary secretion, whilst a larger dose killed. When the uterus was very lax, and admitted of a ready flow of noxious fluid through the sinuses, the woman was stricken down as if by some fell pestilence, and sank in a few hours—"where the secretions are all suspended, and the patient sinks with rapidity." Where the deleterious fluid is introduced in smaller quantity, the system, after a vain struggle with the poisonous infection, sinks in a few days, the chief morbid appearance after death being extensive peritonitis of a peculiar character, copious exudation of soft friable lymph, and much serosity. To a yet smaller amount of deleterious impregnation were attributed uterine phlebitis, metropéritonitis, distension of the lymphatics with purulent fluid; the effects being more local, and the inflammations being the consequences of the first changes induced. Whilst a still smaller amount of infection would produce low febrile conditions, extending over an indefinite period, and sometimes inducing purulent infiltration in various organs of the body. Each of these states being influenced by a variety of concomitant circumstances—as the original condition, state of health, the character of the fluids secreted, the existence of any diathetic disease, epidemic influences, etc. On the question of contagion and the occurrence of epidemics, the author showed that the most experienced in this disease varied so much that no decided conclusion could be drawn. The prevention of the disease, it was urged, could be most effectually accomplished by procuring a complete and persistent contraction of the uterus after the completion of the labour; and that the means usually recommended were not sufficient for this object, it being generally considered sufficient to procure such an amount of contraction as to prevent any hemorrhage, though it was necessary to go beyond this point of contraction before the safety of the woman could be secured. A nourishing and supporting diet was also necessary to remove the physical fatigue and mental anxiety of the labour, to restore the health from the waste occasioned by the previous months of pregnancy, and to enable the woman to pass through the subsequent changes which had yet to take place: much, however, depending upon the previous habits, state of health, and other incidental circumstances. On the subject of treatment, when the disease was once developed, the principles were considered to be—(1) to prevent the further injurious impregnation of the system, either by obstructing the further flow along the uterine sinuses, or by removing the noxious fluids from the interior of the uterus; (2) by supporting the system during the struggle in which it is engaged, and by meeting any incidental complication which might present itself; and (3) perhaps a further source of treatment was now afforded, which might enable us to counteract, to some extent at least, the deleterious impregnation which has already taken place. The first would be attained by procuring, if possible, the further contraction of the uterus, or by inducing the coagulation of the blood in the uterine sinuses. But the principal curative means appeared to rest upon the removal of all noxious fluids from the interior of the uterus, by cleansing it with a tepid solution of any sulphite or hyposulphite of soda each day or oftener; and should any fluid gain entrance into the uterine sinuses, it would probably be more beneficial than otherwise. The means to support the system were too well known to require further notice; whilst deleterious impregnation, which had already taken place, might be met by the internal administration of sulphite of magnesia or lime, in doses of one scruple to half a drachm every two or three hours.

Dr. GRAILLY HEWITT stated that he had long entertained the idea that a very close connection subsisted between a loose relaxed condition of the uterus after delivery, and the supervention of puerperal fever. He had followed a plan of treatment based on this idea, and had frequently insisted upon it in teaching. He considered that the author of the paper had offered anatomical proof of what had been a matter of surmise among many obstetric authorities of late years—namely, that puerperal fever and allied disorders are not necessarily and inseparably connected with the existence of inflammatory changes in the tissues of the uterus and neighbouring parts. He believed, with the author, that the disease arose from the introduction of putrescent or decomposing material into the ute-

rine sinuses, and thence into the general circulation. This was the case in by far the majority of instances, but he believed that the poison was sometimes introduced by other channels. He could not regard puerperal fever as a disease *per se*, and he considered it would be difficult to distinguish anatomically and pathologically between ordinary puerperal fever and that condition produced by the contagion of scarlet fever or other fevers in the lying-in woman; for though the cause might be different, the effect was or might be the same. The essential part of puerperal fever is poisoning of the blood, and this may be effected in various ways. He had, as he had already stated, observed a very close connection to subsist between the relaxed uterus and puerperal fever: he had always found the uterus larger than it should be at the outset of the attack, this increase of size being accompanied with tenderness and other signs. In this respect, therefore, he quite agreed with the author of the paper. It would afford confirmation of the truth of this view of the subject to describe the treatment which he (Dr. Graily Hewitt) had for some time adopted in cases of puerperal fever and its results. Disregarding entirely and completely the old ideas as to inflammatory changes in the uterus, he was in the habit of applying the bandage very tightly over the uterus the moment the first symptoms appeared, and of administering internally a stimulant diet, including large doses of alcohol. Other remedies were used, but they were quite subordinate. Depleting and lowering medicines were wholly omitted. The quantity of alcohol given was sometimes at the rate of as much as two ounces of brandy every two hours. This treatment he had seen cut the disease short in the course of twelve hours. He had the greatest confidence in the efficacy of such treatment in bad cases of puerperal fever, having seen not a few apparently hopeless cases recover under it. In reference to the prophylaxis of the disease, these observations were interesting. The binder served a very important purpose, and he was in the habit of paying the greatest attention to its careful application; believing that in a well-contracted uterus we have the best safeguard against puerperal fever. The facts related by the author of the paper bearing on this latter subject were very important.

The President, Dr. BARNES, agreed with Dr. Beck, that puerperal fever was a distinct thing from typhoid or scarlatina, which often attacked puerperæ, but preserved their essential characters. On the leading idea of the paper—the necessity of contraction of the uterus as a preventive of puerperal fever—he would say, that contraction was eminently desirable to accomplish, but he had seen repeatedly puerperal fever occur in women after perfect contraction, and, on the other hand, no puerperal fever, although the uterus remained relaxed. After the great discussion at the Académie de Médecine, Dr. Martineng published a memoir setting forth this view, and advocating the use of ergot and all means to insure contraction as preservative against fever. Dr. Barnes, having under observation 2000 or more cases yearly of poor women attended by the Royal Maternity Charity, thought he was able to negative the proposition that puerperal fever was more frequent amongst the poor and badly fed. The cases in the Charity were very rare. For one case amongst these women, he saw ten amongst the easier classes. As a means of preventing the loss of blood—as hemorrhage undoubtedly predisposed to puerperal fever—he had found nothing of equal efficacy to the injection of a solution of perchloride of iron into the uterus after clearing out the cavity of placental remains and clots. He had used this plan for several years, and in a large number of cases after labour and abortion, and had always had reason to congratulate himself upon the result. The perchloride of iron had the further advantage of being antiseptic. He had certainly saved several women from death from flooding, and believed these and others had been rendered less liable to puerperal fever. In reply to a question from Dr. Timothy Pollock, the President stated that the plan he adopted was to carry in his “obstetric bag” a saturated solution of the salt. Of this solution he used one part to eight of water. But he thought that even a weaker solution was sufficient. It instantly coagulated the blood in the mouths of the uterine vessels.

Dr. SNOW BECK stated that he had used the soluble sulphites as injections for cleansing the interior of the uterus, from the opinion that they were the most

effectual agents in correcting the condition of the fluids secreted. But he had no doubt other agents would be found equally and perhaps more efficacious, and amongst them probably the preparation of iron mentioned. But if it were even admitted that this plan of treatment were advisable, and devoid of the great danger sometimes attributed to it, then an important step had been attained. He, however, would strongly urge the necessity of procuring complete and persistent contraction of the uterus, and of carrying this contraction further than was usually considered sufficient, as being one of the most effectual means of preventing this most serious disease.—*Med. Times and Gaz.*, April 15, 1865.

HYGIENE.

53. *On the Contagious Affections of the Eye.*—MR. HAYNES WALTON read (May 20th. 1865) an interesting paper on this subject before the Metropolitan Association of Medical Officers of Health.

After some introductory remarks, he said: "The word contagious is used by the profession for the most part as synonymous with infection, but some among them employ the latter in a sense that the former does not admit of—namely, that of contamination by anything injurious to the human frame from any source. I wish to express by it the communication of ocular disease from one individual to another. The direct effect of contagious influence on the eye appears only in conjunctival affections—*i. e.*, inflammation of the conjunctival membrane and of the Meibomian glands, attended with puro-mucous and purulent discharge; but from this surface and single tissue implication, the organ of sight suffers more distress from permanent injury and from complete spoiling, than from all the other diseases which invade it. Yet only some of the forms of the contagious inflammations are recognized, and with scarcely any of them are rules for preservation sufficiently applied, by which I mean those that are really of practical application, for, as in everything of the kind, such treatment can never keep pace with our knowledge for the necessity of it. Nor are the morbid causes which originate them sufficiently taught. I regard all the puro-mucous and purulent diseases as contagious. In some instances the milder forms of some of them, together with the absence of severe ulterior consequences, have been perhaps the cause of this fact being overlooked, or but very partially recognized. If my friends should detect any discrepancy between my former statements and these, they must receive in explanation a wider field for observation and more accuracy in reading disease. Catarrhal ophthalmia, rightly so called, is too well known to require any careful description. It is enough for me to speak of it as conjunctivitis with a puro-mucous discharge, the eyeball proper being unimplicated. The general tendency of the affection is not to invade other ocular tissues. To trace it to an atmospheric origin is generally easy, but that it is contagious can unequivocally be shown. The commonest instances of the contagion are to be found among the poor, not only because of the close proximity of individuals, but of the auxiliaries to be found among their home dwellings that favour its conveyance, and the kindred disadvantages arising out of the communities which legislative enactments provide for them. These vital and physical causes greatly increase the extent of contaminating force. According, then, to the opportunity for this leavening influence, so, most assuredly, will be the propagation of the ophthalmia, and in recognizing which we shall be the better prepared with our treatment. I have witnessed the contagion of catarrhal ophthalmia on a grand scale, I have personally inspected the individual suffering it has occasioned, and I can tell of the obstinacy of its duration. In the year 1861 I was sent for by the guardians of the Central London District Schools, which receive the pauper children of five unions, in consequence of an ophthalmic affection that existed, requested to examine the diseased inmates, and to make a medical report. I may mention, in parenthesis, that the disease had existed prior to the year 1858, although I

was not aware of it, and I get my information from this paragraph, which I take from a report made after my visit by a committee appointed to examine into the state of this and other pauper schools: 'On a careful consideration of the information gained by their visits to these schools, the Committee regret that it is their duty to report that the children at the Central London District Schools present the least satisfactory general appearance, and that this arises principally, though by no means entirely, from the prevalence of an ophthalmic affection. The Committee find that a very large proportion of the children are so affected, and have been so, both before, and continuously since, a similar Committee visited the school in 1858.' There were many hundred children there; I believe some twelve or fourteen. I examined with care, taking notes as I went, two hundred of them affected with ophthalmia, and I well remember the long and tiresome job. I beg to draw attention specially to the fact, significant as I shall show, that there was catarrhal ophthalmia, and nothing more—mild in form, yet definite in symptoms. It had not in a single instance passed into the form of purulent ophthalmia—the most fatal malady to which the eye is subject, and the cause of the greater proportion of blindness in the world. No part of the eye besides that immediately attacked suffered. In not a single instance was the cornea implicated—no ulceration, no sloughing, no opacity. The conjunctiva alone and the Meibomian apparatus were diseased. In a few instances I detected the remains of former eye complaints. It would be scarcely possible to find this number of pauper children under one roof without some marks of strumous ophthalmia. I was struck with the miserable appearance and stunted growth of the children in general; and the answer to my remarks respecting these was, that they could not be otherwise, as they were all bred and born on gin and sprats. I found the clothing very scanty, the diet meagre and badly cooked, and the supply of warmth insufficient. So excessive was the ventilation in the dormitories that, during the previous winter, sometimes the temperature fell to 32°. and with the fires and gaslights it was usually at 45°. I believe it has long been a prevalent opinion, and which has even been taught by some of our authorities, that this ophthalmia, as excited by atmospheric causes, is scarcely, if at all, contagious, as contagion is ordinarily conveyed without palpable inoculation, and other means cognizable to our senses, except it assume an aggravated or virulent form. I find, too, that this opinion was entertained by a surgeon in London of the highest ophthalmic eminence, who visited the school in 1858 with reference to the ophthalmia. He says, in the report of the Committee already quoted: 'Such a complaint is liable to assume more or less of an epidemic character, and may even become contagious.' It has not, however, changed its type; it could never have been less than catarrhal ophthalmia; it could never have been more, and I do not think that any one will doubt the contagion; there could be no question about it. The fullest opportunity was afforded for it, because there was no precaution taken against the occurrence; the diseased and the healthy intermingled. The virus must have been frequently carried by direct inoculation of the recent secretion, as well as by the more general, but subtle, and less cognizable ways of the transfer of particles of poison through the atmosphere. If, therefore, it is proved that catarrhal ophthalmia can be a great curse in a large establishment, without actually spoiling eyes, should there not be much care bestowed in checking it and much supervision exercised? Besides, very trustworthy observers assert that slight circumstances may convert catarrhal into another and severer ophthalmia; and hence has arisen the scourges of this kind in past years in our fleets and armies. That the ophthalmia had not passed into a severe form after so long a time may be considered unusual, although not unaccountable, when the surrounding circumstances are examined. There were absent the conditions for such development. The children were not in the least crowded. There was not any foulness of atmosphere; on the contrary, the entire building was over-ventilated. The utmost cleanliness was observed in the whole detail of management, and the best surgical measures were applied. It was very different, however, with the memorable ophthalmia of the workhouse schools of the Tipperary and Athlone Unions in 1851. I learn from the report of Sir W. Wilde that in the Tipperary establishment the ophthalmia was introduced into the schools in

a mild form, and, as I believe, of the catarrhal type, in the spring of the year, and in October it assumed a more violent and decided character. It there met with a hot-bed for growth and contagion. But it was to be yet further intensified in the workhouse. After Sir William had described the state of those who were seeking admission to this overcrowded and degraded place, as being worn out by previous want and privations of every kind, exhausted indeed to the last degree, he said, 'The general health of the workhouse was very bad indeed. We had cholera, dysentery, fever, and smallpox, as well as several cases of gangrene and dropsy. There was no proper sewerage, neither was there sufficient water to cleanse the entire house or purify the privies, except what a horse brought daily from town.' Being anxious to know what is the present state of the Central London District Schools, I wrote a few days ago to the gentlemen who was surgeon there at the time of my visit, requesting certain information. These are his answers: '1st. The ophthalmia no doubt originated through the admission of three or four hundred children from another school where there had been an outbreak. Secondly. I believe it has not disappeared. I resigned three years ago, as it made too great claim upon my time. A surgeon now resides upon the premises. While I held the surgeoncy, my own assistant, and two others specially engaged for the eye cases, devoted their whole time to the treatment of the children. About four or five hundred cases were at one time under treatment, most of them mild, some chiefly discoverable through the condition of the inner surface of the eyelid. I believe one or both of the ophthalmic assistants remained for a year or two after my resignation. Thirdly. The disease yielded to rigid separation of the disease from the healthy, and mild astringents occasionally. These applications were injected thoroughly under the eyelids, and the utmost cleanliness was at the same time observed, carried out by a largely increased staff of nurses. Fourthly. I regard the disease as only kept under, and circumstances might reproduce it at any time.* It is the bane of these large pauper schools, and unmanageable when it once breaks out.' It is now time to say something about treatment; and have I not been anticipated in this? Has not each of my hearers determined for himself, on his own conviction, the one, and the only one, remedy to be depended on? Who will not say, remove contaminating influence? How this should be done effectually can only be determined when a multitude of other circumstances are examined and considered. It may happen that the separation of the sound from the unsound to the greatest extent afforded by any vast building might be inadequate; but migration of the one or the other to new premises absolutely required. I understand that all the hints which were given by other medical men and myself as to the hygienic deficiencies were attended to, and all the ophthalmic treatment was carried out; but yet you hear the disease is not eradicated. It is, then, the question of prevention which is to be worked out; and fortunate will it be for the public if there should be enough vitality in the meeting of this evening from which shall spring some sources of investigation and observation to discover knowledge to be applied whenever such disease, or a still more severe one, rages, which shall stay the pestilence. I shall not waste our time in talking about ophthalmic treatment; that is almost beyond the question. Then there is scope for difference of opinion, and who is to arbitrate? But on the grand radical matter of isolation I suppose common sense forces us to agree. I hope, sir, that we shall have expressed presently the individual experience of many of the members on this point. For my own part I venture in all such epidemics these suggestions: Absolute separation of the diseased persons from the healthy. Among the diseased also I should extend the classification, if severer cases occurred, for obvious reasons; and it may be wise to have several of these draughtings. The institution of a rigid convalescent system of probation, to prevent relapsing cases from doing mischief. A morning and evening inspection of the whole establishment, so that there may be the most timely removal of diseased individuals. The strictest attention to the withdrawal of any known or supposed exciting cause of the disease. The adoption of the highest hygienic measures among those who are under surgical treatment, so that there may be the prevention of those circumstances and conditions that are likely to intensify the disease. I propose next to make some remarks about purulent ophthalmia

in infants. This dangerous complaint is generally supposed to be almost entirely confined to the lowest ranks of life; a very erroneous impression, although among the poor its ravages are much greater from want of early recognition and proper treatment. I need not take any notice of its contagious nature, as it is seldom so propagated, except in Foundling Hospitals on the continent, and in a few other uncommon ways, because of the isolation in general of the child, and the fact that the mother and the nurse exercise care about their own eyes from the notoriousness of the danger of the disease, and, in addition, the caution usually enjoined by the medical attendant. It is to the origin—the infection, I suppose, I must call it here—that I wish to direct attention. It has been my impression for many years that the laws of preservation might be extensively and effectually applied, and, besides, that the disease, when taken, might be divested of its severity, and its frightful ravages thereby averted. Let me inquire how infant purulent ophthalmia originates. Very, very often, by inoculation with leucorrhœal matter from the mother, by gonorrhœal inoculation from the same source, and sometimes we cannot tell how. Some supposed cases of it called mild are nothing of the sort, but merely catarrhal inflammation. I ought to tell you that the chief difference between these is, that in the purulent ophthalmia the palpebral conjunctiva is more quickly and intensely diseased, its papillary structure getting changed into the state we call granular; hence the mattery discharge and the amount of it. If any one takes the trouble to make inquiries about the state of the mothers of these diseased children, he will be astonished to find how often the leucorrhœal infection prevails. He must not always expect to get the truth by direct inquiries. I should like to ask this question of the accoucheurs, In any well-marked case of leucorrhœa is it practicable to wash out the vagina in the commencement of parturition, so as to prevent the transmission of the disease, and can the object be the better secured by the use of chemical agents? Although I lack information on this point, I can give valuable suggestions on another. Cleanse the eyes of children born under such circumstances at once and most carefully. Daily inspect them, and apply treatment when requisite without delay. I never saw an eye lost that I treated early—that is, before the cornea was affected. Hundreds of eyes would annually be saved if this watchfulness were adopted. What hints for those who have the charge of parish midwifery! Why not tell the mothers of the contingency, and get their watchfulness too? I have found that a premature child seldom escapes maternal infection. The last four cases of purulent ophthalmia that I have had in private practice have been from leucorrhœal matter. Two of the children were premature. Of course infection is not inevitable when leucorrhœa is present. It is here as in other things, infectious and contagious: the escapes cannot be accounted for. Infantile purulent ophthalmia, from the infection of gonorrhœa, is very much less common, and is almost entirely confined to the children of prostitutes. The remarks that I have made about prevention in the last named form of the disease are equally applicable here, and it should be remembered that the gonorrhœal form is the more severe. I shall conclude by making some few and short remarks on the contagion of granular conjunctivitis. Granulation of the eyelid is the term generally used. This is the sequel for the most part of the purulent ophthalmia. The under eyelid is generally the more affected. Strictly, pathologically speaking, it is chronic hypertrophy of the conjunctival villi, and I need not say any more on this head, nor describe the appearances, for everybody must be familiar with what I allude to. There is, too, an accompanying characteristic inflammatory state of the cornea, with more or less of haze or opacity, and redness of the tunics immediately around. This state of the eye is an unexpected source of frequent contagion. It is a deceptive state, I will explain. A true granular eyelid is seldom seen, except as a chronic disease, and it may be a very chronic one. Should there be still any purulent secretion, it is generally scanty and thin. Now the duration and the absence of well-marked pus generally prevent, in the minds of the medical attendant and others, the idea of contagion. But there is a still more disarming state. The granular conjunctiva may exist along with the vascular state of the front of the eyeball, and without any purulent secretion. No one not versed in ophthalmic disease would suspect any contami-

nating danger. But the danger is merely masked. Apparently slight causes, atmospheric changes, fatigue, irritation from dust, or the application of irritating drugs, drunkenness, seem to reproduce the discharge, sometimes with all the former severity, and a patient supposed to be harmless may then inoculate many of those around him with purulent ophthalmia. This granular eyelid clings closely to the poor Irish. At our Ophthalmic Hospital we call it the Irish eye. It is always among the abodes of them in all countries, and I do not think that it is due, as some say, to peculiarities of Irish constitution, but to mere contagion. The Irish take it into our workhouses, schools, and prisons. Yesterday I saw a fine-looking girl in the street, about 14 years old, selling flowers, with a pair of well-marked Irish eyelids. I alighted, and went to learn her history. She was born in England, of Irish parents, and lived in an Irish community. I offered to have her eyes attended to, but she thanked me with 'No;' adding, 'I have some eye-water, sir.' Here is a great scope for the application of preventive measures, and the special field for it is in those establishments which receive the poor, and in which there can be proper supervision and separation. I would subject the unfortunate possessor of granular conjunctiva to the same rules and regulations as if he were in an acute stage of purulent ophthalmia."—*Med. Times and Gaz.*, May 27, 1865.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

54. *Definition of Toxicology.*—M. TARDIEU holds that toxicology does not exist as a true science; it is only an artificial assemblage of certain notions on chemistry, natural history, physiology, nosology, pathological anatomy, and therapeutics, having reference to divers substances, so-called poisons. Again, poison itself has neither existence nor individual characteristic. This is shown by the differences of definition of the word poison, the last of which, by Orfila, and the best is—"that the word poison may, and ought to, be given to every substance which, taken internally, or applied to the bodies of man or animals, destroys health or annihilates life by acting in virtue of its nature." Poisons do not constitute an order or a natural group the essence of which may be defined or characterized, while all substances without exception, which deserve the name, lose or acquire, according to certain external circumstances, their poisonous properties, the medicinal property being always contained in the poison, and the poisonous not being separable from the medicinal property. Toxicology, in its extreme factitious meaning, is forced to set out with the false notion of poison; it studies without method and without processes that are proper to it; and it borrows from physic, chemistry, and botany, the greatest part of the gifts which it appropriates, but which cannot furnish it with the doctrinal principles that are wanting in it. Poisoning, continues the author, in a medico-legal point of view, is one cause of violent death, and ought to be studied as such, in the same way as strangulation, asphyxia, and wounds of all kinds; poison, in fact, is a weapon in the hands of the criminal, and nothing more. It only exists in the condition of having acted; it only reveals and defines itself in its effects—that is to say, in the poisoning; the result is that legal medicine, called in to seek out and determine the cause of every violent death, ought to set out from the fact of the poisoning, and not with the notion of the poison, and should only occupy itself with the poison secondarily, with its state, nature, and physical characteristics; like as in assassination committed by means of a poniard or pistol, the expert examines the murderous weapon, brings it to the wound, and compares it with the injuries that have been inflicted.—*British and Foreign Med.-Chir. Review*, April, 1865, from *Annales d'Hygiène Publique*, October, 1864, and January, 1865.

55. *Elimination of Poisons from the Body.*—M. TARDIEU remarks that the elimination of a poison commences from the first moment of the poisoning, and
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almost instantly after the absorption; if life should continue, the elimination will terminate at the end of a given time, and it would be very useful to determine this time precisely. The period of elimination is very variable, that is undoubted, and it varies under certain conditions which are not yet sufficiently known. The elimination must, like absorption, vary according to special physiological circumstances in the animal species, and according to individual organic conditions, the influence of which it will always be difficult to appreciate with exactitude. M. Chatin has, however, conceived that a law of elimination could be established, and has advanced the statement that the rapidity of elimination in various animals is in an inverse ratio to the faculty of their resistance to the poison—that is to say, a poison will remain so much the longer in organs the economy of which is least affected by it. There is variation also in respect of the duration in each kind of poison, and science is indebted to M. L. Orfila for setting the initiative of very useful, but unfortunately as yet unfinished researches. From these experiments, which are, perhaps, wanting in multiplicity, it results that the elimination of arsenic and corrosive sublimate is complete in thirty days; of tartar emetic, tartrate of antimony, in four months; of nitrate of silver in five months; and of acetate of lead and sulphate of copper after more than eight months.—*Ibid.*

56. *Can Poisoning occur and the Poison disappear?*—On this point M. TARDIEU is of opinion that a poison, almost in its totality, may be vomited and expelled the organism; but it is very rare, and nearly impossible, if the patient live, for a certain portion of the poison not to be absorbed and excreted so as to be detected by analysis in the excretions; it is also rare, if the patient die, for no portion of the poison to be detectable in the various organs into which it would be carried by the circulation. The true question consists in asking—do traces of poison remain in the living body for a determinate period, or does the poison remain indefinitely in the dead body? On this last point the author states that mineral substances resist indefinitely, but they do not escape transformation; some are fixed in such stable combination that chemistry will always detect their presence. Others, on the contrary, by being rendered soluble, are exposed to the possibility of being carried away from the debris of the body in the process of decomposition. Ammonia, which is produced in putrefaction, is the basis of these combinations; but the slowness with which the combinations form, and the still longer time they require for their complete dissolution, under the ordinary conditions of burial, leaves room to say that even after several years, and so long as any part of the body remains, chemistry can find the traces of mineral poisons in exhumed remains. Organic substances, or at least the greater part of those used as poisonous agents, notably the vegetable alkaloids, resist with remarkable fixity and for a very long period. At the same time science cannot say that the organic series are as fixed as the inorganic.—*Ibid.*

Dr. B. W. RICHARDSON states (*Brit. and For. Med.-Chir. Rev.*, April, 1865) that he has detected tartarized antimony in the bodies of animals four months after the last dose of the poison had been taken, the liver being the organ in which the poison was stored. The observations of M. Tardieu on the resistance to decomposition of organic poisons laid up in decomposing organic remains, are worthy of note. We remember seeing Messrs. Rogers and Girdwood demonstrate the presence of strychnia in the rotten tissues of an animal that had been dead two years as perfectly as in a solution of the poison recently made.

57. *Laceration in a New-born Child.*—Mr. R. KING PEIRCE showed to the Obstetrical Society of London (April 5, 1865) a fœtus, born at full time, and exhibiting at birth two lacerations: one extending through the integuments transversely across the abdomen, about the level of the scrobiculus cordis; a second one across the throat, exposing all the vessels and muscles of the neck. The two lacerations had all the appearance of incised wounds; but the evidence was clear that they had not been produced by any act of violence other than that of rapid delivery.—*Lancet*, June 3, 1865.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Rare Case of Double Dislocation. By J. H. POOLEY, M. D., of Yonkers, Westchester Co., N. Y.

About nine o'clock on the evening of Feb. 15, 1865, I was called to see a man who had walked into the open trap-door or grating of a cellar opening on the sidewalk, and met with a severe injury to his shoulder.

The patient was about thirty years of age, dark complexion, black hair and eyes, slenderly built and flabby muscle. I found him holding his right arm in the position generally assumed after the ordinary dislocation at the shoulder and complaining of a great deal of pain. Upon stripping him I discovered not the ordinary luxation downwards into the axillary space, but one forwards, with the head of the bone resting under the clavicle, and the shoulder itself exhibiting more flatness and deformity than I had ever before seen.

The dislocation was reduced in a very few minutes by the method known as reduction by manipulation, which I need not stop to explain, which fortunate occurrence was greatly facilitated by the man being in a nearly fainting condition. After the reduction of the shoulder, I observed what I had nearly overlooked, from its being hidden by a flowing beard, viz., a partial dislocation of the sternal end of the clavicle outwards.

I had once before seen such a dislocation of the clavicle while serving as Assistant Surgeon in the U. S. Army, and having in that case failed to accomplish permanent reduction by any of the various means which were tried, I determined to let this one entirely alone, believing, as it was the source of no present pain or inconvenience, the patient would be, with the exception of a slight deformity, to him a matter of no consequence, none the worse for it.

Upon questioning this patient, he stated that when first sensible of his misstep, he had instinctively thrown out his arm to save himself, and struck with his whole force upon the partially extended arm. This is just the account we should have expected from the nature of the injury; indeed how else than by a force propagated in this way through the series of articulations concerned in the accident could it have been produced.

It is now several days since the occurrence, and he feels no inconvenience from the malposition of the clavicle, and scarcely any from the recent injury to the shoulder.

Fracture of both Femurs in a Child, Successfully Treated. By ARMISTEAD PETER, M. D., of Georgetown, D. C.

Late in the afternoon of May 19th, 1863, I was called to see Johnnie Ellis, æt. 6 years. Upon examination I found a compound fracture of the right femur, a simple fracture of the left; both limbs, at the point of fracture, were concave externally, convex internally, and both fractures occupied the upper fourth. But little tumefaction had taken place when I saw the patient (although several hours had elapsed since the reception of the in-

jury), owing, I suppose, mainly to the constant application of wet cloths. It being late in the afternoon, and having no splints suitable for so small a child, I made out of some thin cypress shingles four straight splints, placed the bones in apposition, put on my temporary splints and rollers, administered an opiate, and left my little patient for the night. The next day I had a pair of Desault's splints made, which, upon trial, suited admirably. These were adjusted to each limb externally, reaching from the axilla to the sole of the foot; I used internally the temporary splints of the evening before; they extended from the perineum to the malleoli. My adhesive strips, placed evenly along both sides of the limbs, carried through the holes of the foot-boards and tied, made all the extension that I could wish. Fearing the chafing and, perhaps, ulceration of the groin and perineum, I determined to do without counter-extending bands. The wound of the right thigh was closed with isinglass plaster and left to take care of itself, which it did most kindly. Of course I *watched* it most attentively with my *nose*, but never *interfered* with it. I have done this several times, in compound fractures of the ulna and radius occurring in young children, putting my splints and rollers on the same as for simple fractures, letting them remain until it was time to free the arm; I have never yet experienced any trouble in so doing. I allude to clean wounds where the solution of continuity was of no great extent. But I am digressing. My patient suffered very much at times with severe pains in the knees, but invariably had a good night upon the exhibition of 15 drops of the elix. opii. Once or twice he was threatened with intermittent fever, but this was soon checked by small doses of quinia administered every morning. I removed the splints June 16th (29 days from date of application), confident that union had taken place; my hopes were not disappointed; two weeks afterwards I had the pleasure of seeing the little fellow walking out. If there was shortening, it must have taken place *equally in both legs*, for he walked as well as he did previous to the injury. As for deformity, there is none. Several physicians here have seen the case, and saw it under treatment; they pronounce it a *perfect* cure, my preceptor, the venerable Dr. Joshua Riley, being among the number.

Compound Acupressure—A Substitute for the Ligature. By N. JEWETT AIKEN, M. D.

In cases of aneurism or wounds of arteries the circulation may be obstructed by this method without the continued irritation and sloughing that attend ligation. The artery is compressed at the point indicated between two needles, which, after being interlocked, are brought parallel and the external ends secured in this approximation; the compression of the vessel is to be maintained for a period of from six to twenty-four hours, or until a firm clot has formed, when the needles are removed and the wound closed.

The needles should be two or three inches long, of the size of common darning-needles or smaller, of steel, rather brittle or soft tempered in the outer or free portion, so as to be easily nipped off at the requisite length—the extremity of one having an eye bent in a short curve; the corresponding end of the other fitted to the eye and having a notch to interlock with it. Several needles, varying in the extent of the curve at the eye, so as to make the included parallel space more or less narrow, would adapt the operation to arteries of all sizes. A pair of nippers and well-waxed silk are also required.

Operation.—The first steps are the same as for ordinary ligation until the vessel is reached when the eye of the first needle (instead of the aneurism needle, but with its aid if necessary), is passed under the artery until the notch of the second can be engaged in it, when they are approximated sufficiently to bring together the inner walls of the artery and so obliterate the channel. A few turns of silk around the needles at the surface will make them secure, and the projecting ends may be removed with the nippers.

Probably, in most cases, a firm clot that will permanently obstruct the circulation would remain after six to twelve hours' compression. Then the needles may be removed, and the wound will readily heal. It might be necessary in some cases to continue the compression for twenty-four hours or longer, but seldom would this seriously retard the healing of the wound in healthy subjects.

To remove the needles it is only necessary to cut the silk that secures their approximation, separate the ends slightly, and by a little manipulation disengage the hook from the eye and gently withdraw them. The wound may be closed with strips of adhesive plaster, or treated according to the indications present in the case.

The advantage claimed for this method over the ligature is that it effectually obstructs the circulation with the least amount of irritation, and without causing sloughing; that it does not destroy the coats of the artery, but simply compresses them. It can be applied, perhaps, in less time than the ligature.

TEKONSHA, MICHIGAN, September, 1864.

Spotted Fever without Cerebro-Spinal Meningitis. By JAMES J. LEVICK, M. D., one of the Physicians of Pennsylvania Hospital.

At the present time, when the true nature of the so-called "spotted fever" is exciting much discussion both at home and abroad, the following notes of a case of this disease coming under the writer's care may not be uninteresting:—

During the prevalence of the epidemic of spotted fever in this city in the early part of last year I was called by my friend, Dr. Scholfield, to see Ellen C——, a tall and robust Irishwoman, residing near Eighth and Filbert Streets. She had been detained at a restaurant, where she was employed as cook, until a late hour of the preceding night. She went to bed at 2 A. M., apparently as well as usual. During the night she was seized with a chill, nausea, and vomiting. This latter continued throughout the night. She was seen by Dr. Scholfield at about 10 o'clock in the morning, and a few hours later by the writer, and presented the following appearance. She was sitting up, gave the history of her attack as noted above, said she had no pain in her head, but complained of severe pain in the region of the heart and epigastrium. The conjunctivæ were injected, and the pupils promptly responded to the stimulus of light. No pulse could be felt at the wrists or at the bend of the arm; the heart was acting feebly and irregularly.

The face presented an extraordinary appearance. On each cheek there were large, dark, purple extravasations of blood, varying from half an inch to an inch in size, while the interspaces were dotted with small petechiæ. On closer examination almost every part of the surface of the body was found to be thus spotted, the spots varying from patches of two inches in width to points not larger than the head of a pin.

Although regarded by us as too ill to be disturbed her removal was in-

sisted on by the people of the house, and the woman was soon after sent in a carriage to the Pennsylvania Hospital. When admitted she was unconscious and moribund, with great lividity of the surface, and she died at 2 P. M., just twelve hours after she had gone to bed apparently in her usual health.

From the time she was first seen by Dr. Scholfield she had taken freely of brandy and quinia.

The *autopsy* was made next day at 11 A. M., in the presence of Drs. Gerhard, Hartshorne, Morton, the resident physicians, and the medical class of the hospital. The appearances presented were as follows: *Exterior*. Rigidity well-marked. The entire surface of the body, excepting those parts on which it rested, was of a dull livid color. There were patches, as before described, on the face, chest, and abdomen, and numerous petechiæ on the legs. On cutting through the scalp there was an escape of dark fluid blood with which the vessels were turgid. A large ecchymosis was found on the left temporal bone, and smaller ones on other parts of the cranium. The meningeal vessels were filled with black blood. The most careful examination failed to detect any evidence of inflammation either in the substance of the *brain* or in its membranes. The *spinal cord* was removed in its entire length, and was examined both by the unassisted eye and with the microscope. It was of a firm consistence, and in every way free from disease.

The *lungs* contained a large quantity of dark fluid blood. There were blood stains on the pleuræ and on the arch of the aorta. The *heart* had undergone a slight fatty degeneration. It contained a large quantity of fluid blood; was free from coagula, excepting three soft clots about the size each of a pea. The *spleen* was firm and of the usual size. The *liver* congested and fatty. The *stomach* and *intestines* both on their outer and inner coats were dotted with innumerable blood spots. A large extravasation was found on the *pancreas*, and one entirely covering the summit of the *uterus*. In the *ovaries* several vesicles were found filled with black blood. A few spots were seen on the bladder, and a large number on and in the kidneys.

June 25, 1865.

DOMESTIC SUMMARY.

Cerebro-spinal Meningitis.—Dr. T. F. PREWITT gives (*St. Louis Med. and Surg. Journal*, May and June, 1865) a brief sketch of this disease as it appeared in his practice in the winter of 1861–62, in Livingston Co., Mo. The disease, he states, “first made its appearance among the soldiers stationed at Chillicothe, during an unusually severe and protracted spell of dry cold weather, and its true character not being at first recognized, it gave rise to a strong suspicion of poisoning, the delirium and dilatation of the pupils which existed in many of the cases suggesting stramonium, or some of the other vegetable narcotics as the poisonous agent. Measles had been prevailing also among the soldiery during the winter, and had proved fatal in some cases, but there is no evidence to show that the appearance of the two diseases, at the same time, or in succession, was more than a coincidence—a coincidence, however, that has been observed in other epidemics as well.”

In all the cases seen by Dr. P., “headache, or rather what was described as severe pain in the head, was a marked symptom—so prominent a symptom indeed, that the disease was known in the counties where it prevailed as the ‘Head

Disease.' Vomiting, too, was a constant symptom, and delirium was generally present at some period of the disease. The pulse varied, sometimes being but little accelerated, soft and intermittent, but generally quick, small, not hard and wiry, but weak and indicating rather prostration.

"There was but little disturbance of the bowels, and, usually, they responded readily enough to the action of cathartics. The tongue was moist, sometimes with a light brown coat upon it; sometimes almost normal in its appearance. Most of the cases complained of great soreness of the flesh, and all of those which proved fatal presented, in the course of the attack, the mottled appearance of the skin mentioned in the first case, but in none, except one, were there petechiæ. In one, a woman aged about 50, there were large livid-looking bullæ upon the feet.

"As far as I am able to recall the symptoms, spasmodic action of the muscles and opisthotonos did not exist to the extent they have been observed in other localities, although present to some extent in most of the cases."

Of the treatment Dr. P. has but little to say, none of the remedies he resorted to having led to satisfactory results.

Quinia produced no good effect, indeed he states it seemingly caused "a positive increase of the cerebral excitement."

"In one of the cases that recovered I treated by bleeding at the outset followed by a pretty free exhibition of opium combined with mercurials. The symptoms in this case were not so severe, however, as in the others. In the other case which recovered, the symptoms were slight, the left arm being somewhat affected, with some headache and nausea. Little or no medication was used in this case. Opium has been recommended with some degree of confidence by eminent practitioners, and is the only remedy to which any number of those who have treated concur in ascribing good effects."

An Epidemic of Typhoid, Typhus, and Spotted Fever.—Dr. T. J. PEARCE, of Mechanicsburg, Ohio, states (*Cincinnati Lancet and Observer*, May, 1865) that residents of his place enjoyed during last summer and fall a remarkable immunity from all forms of fever. "In the month of October, however," he adds, "a soldier returned to his home in our town sick of typhoid fever. His case was well defined, of the enteric form, and confined him to his bed and room some six weeks.

"Before he had fairly recovered, his mother, a healthy woman, about forty years of age, was taken down with the same variety of disease, next a younger brother, and in quick succession other members of the family were attacked, and, finally, five of the same family were sick of typhoid fever within a few weeks from the recovery of the first case—none escaping but the father, a remarkably stout, healthy man.

"From this point of beginning, the disease spread to other families until the majority of the dwellings in that part of the village contained one or more cases of typhoid fever. Gradually it extended to other more distant neighbourhoods in town and country, and finally, this was our prevailing form of disease until in the following February, when it merged into, or gave place to several cases of the alarming disease known as Spotted Fever, which at the present writing, March 23d, has, I believe, subsided, leaving our community again reasonably free from disease.

"The disease, from its commencement to its close, selected its subjects alike from all classes of society. Ease and opulence gave no more immunity than squalor and poverty. The only preference it seemed to manifest was for women and children, there being very few adult males affected at any part of the season.

"The cases arranged themselves into three varieties, appearing to my mind at least, but separate links of the same chain of disease. First we had the well-defined typhoid fever of the enteric variety, next the well-marked typhus, and third, the spotted fever, which last form seemed but a rapid evolution of typhoid or typhus, produced by the same *materies morbi*, but of greater virulence or larger amount, and influenced in its manifestation by constitutional and predisposing differences. These different varieties were attended with all grades of

intensity, from the mildest grade of typhoid fever, in which the patient was scarcely sick enough to take his bed, to the gravest form of the same variety, in which the small and rapid pulse, the tympanitic abdomen, the frequent and involuntary alvine discharges attested the severity of the disease. The well-marked cases of typhus were few in number, compared with the first variety, but the same difference in intensity was manifested, and so of the last most fearful form, spotted fever. Like the cases of typhus, this last variety afforded us but few cases compared with the first, but it showed the same difference in grade. In some cases the patient complaining of but little more than loss of appetite, with pain in back portion of head and neck, with general soreness and uneasiness of body. In others again the disease would be ushered in with the usual chill, the surface soon becoming covered with petechial spots, and the organic nervous centres becoming so severely shocked by the specific cause that death would come to the little sufferer's relief before it had passed many hours or days in this alarming condition."

Large Doses of Tincture of Digitalis in Delirium Tremens.—Dr. S. BARRETT narrates (*Buffalo Med. and Surg. Journ.*, Jan. 1865) the following case of delirium tremens successfully treated by large doses of tincture of digitalis:—

"On the 22d of July last, I was called to see Dr. S. R., aged 35, of Stafford. He has drank to excess for several years—has hardly been sober for the past four or five years. I found him with all those hallucinations incident to such cases; had not slept for two nights or days; been taking opiates, morphia, and hyoscyamus with camphor, and some stimulants; pulse 130 per minute, weak and tremulous; great thirst and constant restlessness, eyes staring, incoherent talking, and constant effort to divest himself of all clothing; I attempted to quiet him by giving chloroform, but it threw him into spasms, with very difficult breathing. When he came fully under its influence, he turned black in the face, and ceased breathing, the heart ceased to beat, and he had every appearance of being dead. I turned him on his right side, and kept up artificial respiration for some minutes, when the action of the heart commenced, and he soon began to catch for breath, and in a little time revived, but as delirious as ever. I then gave him ice to eat pretty freely and tinct. digitalis $\bar{3}$ ss, which he took readily, and ordered him to have the same dose every four hours until he became quiet and slept. I left him to return the next day.

"23d. Visited him to-day at 12 M.; found the doctor quiet, 'clothed, and in his right mind;' he had slept about six hours, had taken $\bar{3}$ jss of the digitalis; pulse normal, skin moist, thirst gone. From this time he convalesced rapidly. Six days after he called to see me; appetite good; says he had never felt better in his life.

"The few cases of this disease which have come under my care the past two years have been treated with this remedy, and the results have been to me every way satisfactory. That it is a specific I do not claim, only that it is worthy of trial."

Influence of Alcohol upon Animal Temperature.—Dr. J. S. LOMBARD, of Boston, records (*New York Med. Journ.*, June, 1865) some experiments undertaken by him with a view to determine the extent to which alcohol is capable of influencing the temperature of the body.

The results, if correct, of these experiments, "go to prove, first, that alcohol possesses the power of increasing the temperature of the body; and second, that so long as the quantity taken be not excessive, this increase is not followed by any depression below the temperature existing before taking the alcohol. If, however, the dose of liquor be excessive, there will ensue a greater or less depression of all the functions, and with the rest, that of producing heat may suffer.

"But although the ingestion of alcohol causes a rise of temperature, yet its power in this respect is, so far as I can judge from my experiments, comparatively feeble to that exercised by muscular exertion, for I have almost invariably found that a very few moments' active exertion produces a considerably greater effect on the temperature of the body, than a large amount of alcohol.

"Still, cases frequently occur in which the body is exposed to the action of causes tending to reduce its temperature, while at the same time obstacles to muscular exertion exist, and in such cases alcohol may doubtless prove highly beneficial."

Necrosis of the Femur.—Dr. J. MASON WARREN has recorded (*Boston Med. and Surg. Journ.*, March 16, 1865) the following case of this:—

"Mr. F., 28 years of age, applied to me in February, 1864, on account of a necrosis of the femur, for which he requested to have an amputation performed. When he was 15 years old, he received a shock in the limb by jumping from a wall, which was followed by severe inflammation ending in abscess, which opened at the lower and inner part of the thigh, just above the knee. In the course of a year, abscesses formed along the whole length of the limb, communicating with the bone, some in front and some on the outer side, as high as the trochanter major; through these apertures small bits of bone were occasionally discharged. In the course of the first year, while bearing some weight on the leg, the femur gave way in its lower third, but united again, with shortening of three or four inches, and with a decided bend outwards. During the last eight years he has suffered much at the original site of the disease, the inflammation extending to the knee-joint, which is now nearly stiff. During nearly half of this period of thirteen years he has been confined by successive attacks of inflammation, and he finally decided to submit to an operation by seeing that his future usefulness and comfort were likely to be altogether destroyed. A consultation was held upon the case at the hospital, which resulted in the decision to remove the limb at the level of the highest fistulous opening, which was at the commencement of the upper third of the femur, and, in case the sequestrum should be found to extend higher, to attempt its forcible extraction by means of forceps, as I had before successfully accomplished in a similar case, where it was important to preserve as long a stump as possible. The exact amount of bone diseased could not be accurately determined, owing to the severe pain and protracted constitutional disturbance which had several times followed the attempt to probe the lower openings in the popliteal region, and which was explained on dissection by the proximity of the sequestrum to the popliteal nerve.

"The operation was performed Feb. 27th. A flap was first cut out on the front and outer side of the thigh, having its base at the upper aperture already described, which was placed rather on its inner aspect. An inner and posterior flap was then made, and the bone sawed off just above the point of junction of the flaps, which proved to be in the sound bone, three-quarters of an inch above the upper extremity of the sequestrum. This was about four inches long, and lay loosely encased in a cavity in the back and lower portion of the femur, which was open for the most part, but was crossed at about the middle of its length by a bridge of new bone of about half an inch in breadth. The nerve, as above stated, lay directly on it. The sequestrum was so loose that it could have been entirely removed if it had been possible to reach it by any justifiable operation. The knee-joint had been partially disorganized by inflammation, two small surfaces, however, remaining on the condyles still covered by cartilage, each about half an inch in diameter, and corresponding to the articulating surfaces of the tibia, which were concerned in the slight motion remaining. On the curved portion of the bone, in front and opposite to the sequestrum, were marks of the very oblique fracture which had taken place during the first year of the disease. The specimen is now in the Warren Anatomical Museum.

"In connection with this case, I have been led to the remark that I have seen very few cases of extensive necrosis of the femur which have been relieved by operation. The records of the Massachusetts General Hospital show the same fact. In one case, a young man, I removed half of the shaft, near its lower extremity, with perfect relief; in another case, of twenty years' duration, which was one of necrosis of the whole length of the shaft of the bone, the operation was followed by so long and exhausting suppuration as to compel the amputation of the limb just below the trochanters, to save the patient's life. Curious to relate, this man afterwards died of an extensive cancer of the stump. In the present case, even if the removal of the dead bone had been practicable, the

patient would have been left with a deformed limb, three or four inches shorter than its fellow, and with little or no useful motion of the knee-joint.

"It may be interesting to mention that in this case, as is usual where there has been much previous inflammation in the amputated limb, the hemorrhage from the smaller vessels was very abundant.

"The convalescence was slow, and interrupted by a series of abscesses in the stump. Although no exfoliation of bone took place, it was several months before the patient was well enough to return to his home in the country, but with his stump only partially healed. In October, 1864, I saw him in fine health and high spirits, his stump entirely healed, and having gained thirty or forty pounds of flesh. This increase in weight, as is well known, is not unusual in persons who have submitted to amputation after having gone through with a long suppuration from a diseased limb."

Gunshot Wound of the Bladder.—Dr. W. H. VAN BUREN records (*New York Med. Journ.*, May, 1865) the following interesting case of this:—

"L. L. J., 46, married, and father of a large family, in sound health, and of good constitution, was wounded at 5 o'clock P. M., on the 16th July. He had not emptied his bladder since leaving home, about 9 o'clock A. M.; had attended to his business as usual down town, and dined at Delmonico's at 3½ o'clock P. M., drinking moderately of Bourbon whiskey. Was conscious that his bladder was distended before receiving his wound. I saw him half an hour after he was struck; he was pallid and moderately collapsed. Stated that when struck by the ball, it seemed to him as though a foot-ball had hit him in the belly. His first motion was, to put his hand to the part when he recognized that he was deluged with water (urine); he then sank to the ground, and was carried to his house, about two hundred yards distant. I found a wound—which would readily admit my forefinger—in the lower part of the belly, 1½ inch to the left of the median line, and 2 inches above the brim of the pelvis. The finger passed to its full length into the wound; could be moved freely in any direction in a cavity behind the abdominal walls, where nothing could be satisfactorily distinguished but coagulated blood. Urine still flowed from the wound, and the patient's trowsers and shirt were saturated with it. In both of these garments there were rectangular holes, with obvious loss of substance. On careful percussion above the pubes, there was no evidence of distended bladder, or any collection of fluid, nor could anything abnormal be discovered from the rectum. Under the skin, on the back of the right buttock, about one inch above the summit of the ischiatic notch, a bullet could be distinctly felt. This was afterwards removed by a simple incision, and no exploration made by the finger from this quarter; there was no discharge of urine from this incision—which healed kindly in a week.

"The course of the ball was apparently, therefore, directly across the pelvis from left to right, and from before backwards on a level with the anterior superior spines of the ilium. No other lesion was discoverable. The abdomen was soft, natural, and not tender; somewhat prominent—the patient weighing 165 pounds, and measuring 5 feet 9 inches in height. His bowels, as usual, had moved naturally in the morning. The pain was slight, but there was strong and pretty constant desire to void urine, although not a drop could be passed through the urethra; from time to time a little would escape through the abdominal wound, tinging the cloths slightly with blood.

"After a careful study of the indications for treatment which the case presented, it was decided not to introduce an instrument into the bladder by the urethra, and to favour the free flow of urine from the wound, as far as possible, by position. One-fourth of a grain of sulphate of morphia was ordered to be given at once, and repeated every second hour, with good beef-tea for nourishment, and nothing else save ice and water moderately. At 10 o'clock P. M. he was engaged in arranging some matters of business; had recovered from collapse almost entirely; no complaint of pain or desire to pass water; pulse 80, and of good volume; abdomen soft and hot, tender on pressure; urine flowing from the wound. Morphia continued.

"From this date there was no bad symptom. The urine continued to flow

from the wound freely, and without interruption. Its escape was found to be facilitated on moving the trunk or pelvis, and especially by rolling over upon the left side. The only dressing applied to the wound was a moistened rag.

"The morphia acted very kindly, and it was repeated steadily as first ordered, until the eighth day, when it was suspended to facilitate the action of half an ounce of castor oil, which produced two copious stools, unaccompanied by pain or blood—the first motions since the day of the wound. Meanwhile there has been no pain whatever complained of, nor any on pressure of any part of the abdomen, which continued soft and supple, the colon only becoming moderately distended by gas, of which the patient was able to relieve himself *per anum*. The pulse on the third day reached 100, and showed a little hardness and tension. Nothing was done, and it gradually subsided. On the ninth day, after the action of the oil, it was 66. After this the morphia was only administered occasionally to quiet restlessness. On the seventh day, for the first time since the evening, he was wounded, the patient felt a desire to pass water, and did so twice, with slight uneasiness in the act; it was turbid in appearance, and deposited a sediment looking like pus. On examining this sediment by the microscope, however, it was found to consist mainly of vesical mucus and oil-globules, with some pus-corpuscles, and a few crystals of oxalate of lime and of the triple phosphate.

"On the eighth day, after passing water by the urethra, he experienced quite a severe pain in the right thigh below the great trochanter, which lasted more than an hour, and for which he took a dose of morphia. This annoyed him so much that he preferred to empty his bladder through the wound, which he continued to do without difficulty until the fifteenth day, when I advised a new trial of the natural route. This was followed by less pain, and from this time he used the urethra entirely, at intervals of three and four hours. The wound, which up to this time had been coated by the urine salts, rapidly became clean, discharging only a trifling quantity of healthy pus. At this time, as there was no evidence of pelvic or abdominal trouble, that could be elicited by pressure, coughing, movements of the trunk and hip-joints, or action of the bowels, his diet was gradually improved.

"On the twenty-second day the wound was entirely healed, and the patient's general condition in every respect satisfactory.

"No shreds of clothing nor spiculæ of bone were discharged from the wound, and there has not been any abscess or evidence of local trouble. The temperature, during the first two weeks of his confinement, was never below 80°, varying from this to 92°.

"I have examined and conversed with Mr. Jay this day, more than eighteen months since his accident. He is in perfect health, and is not aware of any defect whatever in the normal performance of his urinary function; nor has he any symptoms of trouble in this quarter since his recovery. At present he never has occasion to pass water more than four times in the twenty-four hours, and generally three times. Before his wound his calls were even less frequent, occurring, as a rule, rarely more than twice in the twenty-four hours.

"The rapid recovery of this patient from so severe a wound was due, in some degree, to his placid disposition and excellent nursing, but mainly, I suspect, to the very considerable distension of the bladder, at the moment the musket-ball traversed his pelvic cavity. The peritoneum was probably carried up by the distended bladder above the track of the ball, although, considering the point of exit, this cannot be regarded as certain. The entire absence of any symptoms of urinary infiltration into the connective tissue of the pelvis, is as remarkable as the escape from peritonitis, and is most readily explained by the size and directness of the abdominal wound, which afforded prompt and free outlet for the urine. It was this feature of the case which induced me to refrain from the use of the catheter, as generally employed in wounds of the bladder; and the prompt subsidence of the desire to urinate, after the first dose of morphine, conduced also to this course—which I see no reason to regret.

"The continuous presence of a catheter in the urethra and bladder of a man, already suffering from a most serious wound, is no trifling addition to the burden he has to bear, and although, in deference to all high authorities from Chopart and the Larreys to Legouest and Hamilton, the use of the instrument

is properly regarded as the rule in gunshot wounds of the bladder, the result of this case demonstrates that the rule may be occasionally disregarded, to the advantage of the patient."¹

Poisoning by Veratrum Viride.—Dr. J. C. HARRIS, of West Cambridge, records (*Boston Med. and Surg. Journ.*, April 27, 1865) the following case:—

J. C., aged one year and six months, was attacked with pneumonia, from which he made a good recovery, the chief remedy in the active stage being veratrum viride—the dose being four drops of the tincture, repeated every four hours. When the child ceased taking the veratrum, there remained forty or fifty drops mixed with water, in the proportion of four drops to a teaspoonful, which the mother saved for future use, keeping it in a cup four or five days, then pouring it into a bottle. About six weeks after this, the child caught cold, was feverish, and had some difficulty in breathing. The mother commenced giving the veratrum every half hour, in teaspoonful doses of the mixture she had saved, until four or five doses had been given, a tablespoonful was given for one dose by mistake. The whole quantity taken was probably not less than thirty-five drops, for the four or five days' evaporation must have increased the proportionate strength of a dose at least one drop.

There was an effort to vomit after the second dose, but without ejecting anything from the stomach. Efforts to vomit were made every few minutes, but without success, except once; when a small quantity passed from the mouth. I was called to the child about seven hours after taking the first dose. I found him apparently unconscious, very pale, breathing heavy—almost stertorous; pulse 40, extremities cold, and a profuse cold perspiration over the whole body. These symptoms I supposed were the result of the large doses of the veratrum. I made no attempt to remove the contents of the stomach, but ordered mustard paste to be applied to the chest, abdomen, and extremities, and carbonate of ammonia and camphor—three grains of the former to one of the latter—every hour, and a drachm of brandy intermediately. This treatment was kept up until the child died, about thirteen hours after taking the first dose of the veratrum.

Remarks.—This child had always been feeble, and his mother was in the habit of frequently dosing him for real or imaginary sickness. It is possible, if not probable, that the result would have been different had there been free emesis within an hour or two after taking the medicine. I did not attempt to remove the contents of the stomach, for the case seemed almost hopeless when I first saw it.

This is the first case of death from an overdose of veratrum viride I have seen or heard of, and therefore it is possible I did not pursue the best course of treatment.

¹ In his recent admirable *Treatise on Military Surgery*, p. 3718, Professor Hamilton records a case of recovery from gunshot wound of the bladder, in which the catheter was never introduced.

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TO READERS AND CORRESPONDENTS.

CONTRIBUTORS who design to favour us with original papers for the next No. of this Journal should forward them before the 1st of November next.

The following works have been received:—

Transactions of the Epidemiological Society of London. Vol. II. Part I. Sessions 1862-63, 1863-64. London: Robert Hardwicke, 1865. (From the Society.)

Contributions to Assist the Study of Ovarian Physiology and Pathology. By CHARLES G. RITCHIE, M.D., Member of the London Obstetrical Society, &c. &c. London: John Churchill & Sons, 1865. (From the Publishers.)

Chloroform: its Action and Administration. A Handbook. By ARTHUR ERNEST SANSON, M.B. Lond., &c. &c. London: John Churchill & Sons, 1865. (From the Publishers.)

The Student's Book of Cutaneous Medicine and Diseases of the Skin. By ERASMUS WILSON, F.R.S. London: John Churchill & Sons, 1865. (From the Publishers.)

Tension of the Eyeball, Glaucoma, &c. Some Account of the Operations practised in the Nineteenth Century for their Relief. By J. VOSE SOLOMON, F.R.C.S., Surgeon to the Birmingham and Midland Eye Hospital, &c. London: John Churchill & Sons, 1865. (From the Publishers.)

On the Arrangement of the Muscular Fibres in the Ventricles of the Vertebrate Heart; with Physiological Remarks. By JAMES BELL PETTIGREW, M.D., Edin., Assist. in Museum of Royal College of Surgeons of England, &c. From Philosophical Transactions, Pt. III., 1864. London, 1864. (From the Author.)

On the Application of Physiological Tests for certain Organic Poisons, and especially Digitaline. By C. HILTON FAGGE, M.D., and THOMAS STEVENSON, M.D. London, 1865. (From the Author.)

Lectures on the Diseases of the Stomach; with an Introduction on its Anatomy and Physiology. By WILLIAM BRINTON, M.D., F.R.S., Physician to St. Thomas's Hospital. From the second London edition. Philadelphia: Lea & Blanchard, 1865. (From the Publishers.)

Lectures on Fever, delivered in the Memphis Medical College, in 1853-56. By A. P. MERRILL, M.D., Prof. of the Principles and Practice of Medicine. New York: Harper & Bros., 1865. (From the Author.)

The Use of the Laryngoscope in Diseases of the Throat: with an Appendix on Rhinoscopy. By MORELL MACKENZIE, M.D., Lond., &c. &c. Philadelphia: Lindsay & Blakiston, 1865. (From the Publishers.)

The Physician's Visiting List, Diary, and Book of Engagements for 1866. Philadelphia: Lindsay & Blakiston, 1865. (From the Publishers.)

Researches on the Medical Properties and Applications of Nitrous Oxide. Protoxide of Nitrogen or Laughing Gas. By GEO. J. ZIEGLER, M. D., Physician to Philadelphia Hospital. Philadelphia: J. B. Lippincott & Co., 1865. (From the Publishers.)

On the Direct Influence of Medicinal and Morbific Agents upon the Muscular Tissue of the Bloodvessels. By H. CRESSON STILES, M. D., Phys. to King's County Hospital. New York, 1865. (From the Author.)

On Sleep and Insomnia. By WM. A. HAMMOND, M. D., of New York. (From the Author.)

Treatment of Dysmenorrhœa and Sterility resulting from Ante flexion of the Uterus. By THOMAS ADDIS EMMET, M. D., Surgeon to Woman's Hospital, New York. New York, 1865. (From the Author.)

Proceedings of the Academy of Natural Sciences of Philadelphia. April, May, and June, 1865.

Quarterly Summary of the Transactions of the College of Physicians of Philadelphia. From June 1, 1864, to February, 1865. Philadelphia, 1865.

Tenth Annual Report on the Births, Marriages, and Deaths in the City of Providence, for the Year 1864. By EDWIN SNOW, M. D., Superintendent of Health and City Registrar. Second Edition. Providence, 1865. (From the Author.)

Report of the Recording Clerk of the Hospital Department, and the Physician and Superintendent of the Insane Department, for the Year ending Dec. 31, 1864. Philadelphia, 1865.

Report concerning the Field Relief Service of the United States Sanitary Commission with the Armies of the Potomac, Georgia, and Tennessee, in the Department of Washington, May and June, 1865. Washington, 1865.

Circular addressed to the Branches and Aid Societies tributary to the U. S. Sanitary Commission. July 4, 1865.

Valedictory Address delivered before the Medical Class of the University of Vermont, May 31, 1865. By JOHN ORDRONAU, M. D., Prof. Phys. and Med. Jurispr. New York, 1865. (From the Author.)

Annual Announcement of the Medical Department of the University of Buffalo, for the Session of 1865-6. Buffalo, 1865.

Medical Department of the University of Louisville. Announcement for the Session of 1865-6. Louisville, 1865.

Nineteenth Annual Announcement of Starling Medical College, Columbus, Ohio, for the Session of 1865-6. Columbus, 1865.

Annual Circular of the National Medical College (Medical Department of Columbia College), Washington, for the Session of 1865-6. Washington, 1865.

Annual Announcement of the St. Louis Medical College, Session 1865-6. St. Louis, 1865.

Sixth Annual Announcement of the Miami Medical College of Cincinnati. Cincinnati, 1865.

Annual Announcement of the Faculty of Medicine of McGill University, Montreal, for the Thirty-third Session, 1865-6. Montreal. 1865.

Annual Announcement of the Cleveland Medical College, Session 1865-6.

The following Journals have been received in exchange:—

The British and Foreign Medico-Chirurgical Review. July, 1865.

The Half-Yearly Abstract of the Medical Sciences. January to June, 1865. Vol. XLI.

The Retrospect of Medicine. Edited by W. BRAITHWAITE, M. D., and JAMES BRAITHWAITE, M. D. Vol. LI. January to June, 1865.

The Ophthalmic Review. Edited by J. ZACHARIAH LAURENCE and THOMAS WINDSOR. July, 1865.

Medical Times and Gazette. July, August, September, 1865.

British Medical Journal. Nos. 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238. 1865.

The Medical Mirror. June, 1865.

Edinburgh Medical Journal. June, July, 1865.

The Dublin Quarterly Journal of Medical Science. May, 1865.

The Medical Press. July, August, 1865.

The Medical and Surgical Review. [Australian.] February, March, 1865.

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Annales Médico-Psychologiques. Par MM. les Docteurs BAILLARGER et CERISE. May, 1865.

The Boston Medical and Surgical Journal. Edited by SAMUEL L. ABBOT, M. D., and JAS. C. WHITE, M. D. July, August, September, 1865.

The Cincinnati Lancet and Observer. Edited by E. B. STEVENS, M. D., and J. A. MURPHY, M. D. July, August, September, 1865.

The New York Medical Journal. July, August, September, 1865.

Buffalo Medical and Surgical Journal. Edited by JULIUS F. MINER, M. D. June, July, August, 1865.

The St. Louis Medical and Surgical Journal. Edited by M. L. LINTON, M. D., and F. W. WHITE, M. D. July, August, 1865.

The American Journal of Insanity. Edited by the Medical Officers of the New York State Lunatic Asylum. July, 1865.

The Chicago Medical Journal. Edited by DE LASKIE MILLER, M. D., and E. INGALS, M. D. July, 1865.

The Chicago Medical Examiner. Edited by N. S. DAVIS, M. D. July, September, 1865.

The Pacific Medical and Surgical Journal and Press. Edited by HENRY GIBBONS, M. D. June, August, 1865.

The Sanitary Commission Bulletin. July, August, 1865.

Nordamerikanische Deutsch medizinische Zeitschrift. Herausgegeben von W. MEISBURGER, M. D. Bd. I. June and August, 1865.


The American Journal of Pharmacy. Published by Authority of the Philadelphia College of Pharmacy. Edited by WILLIAM PROCTER, Jr., Professor of Pharmacy in the Philadelphia College of Pharmacy. July, September, 1865.

American Druggists' Circular and Chemical Gazette. July, August, September, 1865.

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THE
AMERICAN JOURNAL
OF THE MEDICAL SCIENCES
FOR OCTOBER 1865.

ART. I.—*On the Pathological Appearances presented in Marsh Fever.*

By J. FORSYTH MEIGS, M.D., one of the Physicians to the Pennsylvania Hospital.

IN the admirable work on diseases of the liver by Dr. F. T. Frerichs, the first volume of which was published in Breslau in 1858, and the second in 1861, and which has been translated for and published by the New Sydenham Society—a work which must take its place as a model of medical observation and research—will be found a chapter entitled, “The Pigment Liver; Melanæmic Liver; Alterations in the Liver resulting from Intermittent Fever.” My attention having been attracted with unusual interest to the facts and doctrines portrayed in that part of the work, I became anxious to ascertain whether the same pathological appearances as those observed by Dr. Frerichs could be found in cases of malarial disease occurring in this country.

The following cases were observed in the wards of the Pennsylvania Hospital of this city during the past autumn, and, though few in number, they are sufficient to attest the accuracy of the statements made by Dr. Frerichs.

The first case was that of a young unmarried woman who, when brought to the hospital, had been suffering for six weeks with intermittent fever, contracted in one of the lower counties of Maryland. The disease was tertian at first, from which it became quotidian, and so continued until the patient entered the wards. No quinia had been exhibited, and the disease therefore presented its natural characters uninfluenced by specific treatment. The patient was not very much reduced in flesh, but was excessively feeble, blanched in colour, and had lost all appetite. The spleen descended two inches below the margin of the chest. She had a chill every afternoon;

followed by fever and sweating, but exhibited no other signs of disease. On pricking the finger and placing a drop of blood under a quarter-inch lens, it was seen that the red corpuscles were not more than one-fourth as numerous as in health, the white corpuscles were about normal in quantity, but what especially arrested attention was the presence in the field of numerous minute particles of irregular shape, with angular edges, of blackish colour, and entirely opaque. These were the pigment granules of Dr. Frerichs.

The patient was put to bed. Sixteen grains of quinia were given daily, milk punch, bread and milk, and beef tea were ordered for diet, and the chills were arrested after the second day. Citrate of iron, five grains three times a day, was ordered on the third day, the quinia was reduced to twelve, and then to six grains daily, and in a week the patient was convalescent.

Soon after this, three sailors were brought to the hospital from a vessel which had been lying four weeks in the harbour of Aspinwall, in the Isthmus of Panama, and which had been five weeks on the voyage from that port to Philadelphia.

I am indebted to two of the resident physicians of the hospital for notes of the cases, and for details of the post-mortem examination, and of the microscopic appearances—to Dr. T. H. Andrews, for the former, and to Dr. Edw. Rhoads, for the latter.

CASE I. Geo. H., aged 27, a native of New York, was admitted Nov. 12th, 1864. Whilst at Aspinwall he had been seized with intermittent fever, at first tertian, and then quotidian in type. This was checked by quinia at first, then returned at one of the septenary periods, and continued until he reached the hospital. Owing to the disease and to poor fare on board ship, he had lost flesh rapidly. After admission, he had a chill every day at one o'clock, lasting about half an hour, followed by fever and sweat. He had no appetite, suffered from constipation, was very pallid and feeble, but had no other material sign of disease, except decided enlargement of the spleen. A mild cathartic was exhibited; he was ordered thirty grains of sulphate of quinia in the first interval; milk punch and beef tea were given in quantities of a wineglassful every two hours alternately, and, the chills soon ceasing to occur, the quinia was reduced to sixteen grains. Under this treatment the patient improved rapidly and steadily, and, though still pale and weak, he decided to leave the hospital on the 21st.

CASE II. G. S., aged 32, native of Ireland, admitted November 12th, 1864. Has been a seaman for twenty years; was always strong and healthy, weighing about 150 lbs., but addicted to the use of alcohol to excess. About eight weeks before admission, whilst his ship was lying in port in Aspinwall, was seized with intermittent fever, of a typhoid type, which was checked by the use of quinia. Soon after this, his legs became dropsical, so that when the vessel left Aspinwall he was disabled from duty. During the voyage to Philadelphia, the fare on board ship was very poor, so that when he reached the hospital he was greatly re-

duced in flesh and strength. He now had anasarca of the lower extremities and of the trunk; ascites; excessive tympany; copious, watery diarrhoea; pallid, cool, and moist skin; pinched and anxious countenance; pulse 88, and feeble; respiration 36, and laboured. The tongue was coated, and the appetite not bad, but he could take only small quantities of food, owing to the gastric distress which it caused. The spleen was enlarged and tender on pressure. No abnormal sounds in the lungs; heart sounds healthy. The urine was normal in amount, alkaline, specific gravity 1013, highly albuminous, containing in the nebulous deposit many pigment flakes and granules of variable size and colour, usually reddish-brown. Blood drawn from the finger exhibited under the microscope more than the normal proportion of white corpuscles with several pigment granules in each field. The red corpuscles appeared gelatinous, and not only gave up their colouring matters in the added water, but, for the most part, entirely dissolved, or left only a filmy residue.

He was ordered sulphate of quinia, eight grains daily, compound spirits of juniper two drachms four times a day, infusion of juniper half a pint daily, and a diet of milk punch and essence of beef, a wineglassful every two hours alternately. Laudanum enemata were occasionally given to check the diarrhoea. His condition remained much the same under this treatment, when his friends, in spite of his extreme illness and exhaustion, removed him from the hospital on the 24th of November.

CASE III. W. L., sailor, aged 23, native of New York, was admitted November 12th, 1864. Five weeks before admission he had sailed from Aspinwall, after lying in that port during about four weeks. Whilst in port, and engaged in cleaning the paint on the ship's sides, he was overcome with heat and exposure, was seized with headache, rigors, pain in the back, and diarrhoea, so as to be forced to take to his bed. During the passage home, which lasted five weeks, he had poor and insufficient food, was very weak, unable to do duty, and, in addition, his malarial disease became scorbutic, so that he was emaciated, and had sores on the wrist, hip, sacrum, and back. When brought to the hospital he was in a condition of profound cachexia. The pulse was frequent and feeble, the skin not very hot, the urine scanty, the feet œdematous, and he was excessively feeble. The heart and lungs presented no marked symptoms or signs of disease.

He was ordered quinia, four grains every four hours, tincture of the chloride of iron, ten drops every four hours, milk punch and beef tea, of each a wineglassful every two hours alternately. He was also allowed spinach, onions, and lemonade. He had an opiate at bedtime. The bowels were moved by an enema when necessary. He improved slightly at first, then sunk again, and died November 18th.

Autopsy (from notes by Dr. Rhoads), fourteen hours after death.—Figure of medium height; extreme emaciation and pallor; ill-conditioned ulcers over prominent osseous points; rigor mortis very slight; muscles atrophied; feet œdematous.

Thorax.—Pleura smooth, clear, and healthy throughout; one pint of limpid, straw-coloured fluid surrounding each lung; about one ounce of similar effusion in the pericardium; heart flabby, slightly dilated, distended; in the left ventricle a soft, gelatinous, dark coagulum, with coloured serum; in the right ventricle and auricle, extending through the tricuspid and pulmonary valves, intertwining with the cords and adhering to the walls, a

firm, white, fibrinous clot. Lungs in posterior-inferior portions hypostatically congested and imperfectly expanded, but everywhere inflatable.

Abdomen.—Peritoneum smooth and clear, containing nearly six ounces of serous fluid.

Liver.—Firm, of a dark bronze colour; weight four and three-quarter pounds; section surface mottled by the marked congestion of hepatic veins; gall-bladder partially filled with bile.

Spleen.—About twice the natural size; weight twelve ounces; soft; almost black.

Kidneys.—Not enlarged materially; cones congested; conspicuous in section.

Bowels.—Pale; no ulceration or thickening of their mucous membrane. The epithelium in the colon disposed to separate as from the healthy membrane after maceration.

Mesenteric glands.—Healthy in appearance.

Microscopic appearances.—The splenic pulp presented its usual elements with a large excess of blood. Corpuscles unchanged, or in various conditions of disintegration. Scattered in great abundance over the field, both free and within the nucleated corpuscles, pigment granules, irregular in shape and outline, rounded or angular, varying in colour from absolute black, with the strongest light, to the lighter shades of reddish-brown at the edges or throughout, and in size from the $\frac{1}{100}$ of a line in diameter to a mere point.

Liver.—Hepatic cells healthy. Pigment grains everywhere present; somewhat less numerous than in the spleen. They were not observed within the cell walls.

Kidneys.—Epithelial cells enlarged; incipiently fatty. More engorgement of the straight capillaries in the medullary than of those in the cortical portion. Similar pigment granules to those in the spleen and liver, but much less numerous.

Blood in cardiac cavities.—More than the normal proportion of white corpuscles. Marked deficiency of fibrin (except in old clot on right side). Red corpuscles individually much darker than in health; their colouring matter readily passing into and tinging water on the addition of that fluid. Several pigment granules in each field.

Heart.—Muscular fibres healthy; capillaries filled with blood; an occasional aggregation of fine granules visible.

The *lungs* exhibited much pigment, but an excess over that usually found in the organs could not positively be affirmed.

Remarks.—Dr. Frerichs states that in individuals who die from the effects of marsh poison there are frequently found peculiar changes in the liver, spleen, brain, kidneys, and blood, which evidently belong to the disease resulting from that poison. Believing that these discoveries have not been brought before the medical public of this country, as they deserve to be, I shall, in as few words as possible, quote them on this occasion.

The most important of these pathological appearances are the following: The liver presents a steel-gray or blackish, or, not unfrequently, a chocolate colour. This change in colour is caused by pigment matter which is accumulated in the vascular apparatus of the gland. The larger part of the pigment is found in the capillary network of the portal and hepatic

veins, but it is also found, in most cases, in the branches of the hepatic artery. The hepatic cells are said, by Frerichs, to remain exempt, he having, in no case, observed any pigment in them, as has been asserted by Virchow. It is stated, however, in a note, that, after extravasations of blood into the hepatic parenchyma, deposits of red, brown, and black pigment in the cells are not unfrequently met with. In one case of cirrhosis he met with extensive masses of this nature. The cells were found either normal or filled with brown bile; or sometimes infiltrated with oil, and occasionally, but only after a long continuance of the disease, they contained colloid or lardaceous matter.

In acute cases the size of the organ is either normal or enlarged; at later periods it diminishes in volume and undergoes a true atrophy, unless it have been infiltrated with colloid matter, a condition which was met with only in rare instances.

The spleen undergoes similar changes. It is dark brown, or sometimes bluish-black, and its parenchyma contains large quantities of the same pigment as that found in the liver. In acute cases it is enlarged, softened, and congested. In less severe cases its volume is not much changed, unless, as seldom happens, it undergoes lardaceous degeneration, in which case its volume and consistence are considerably augmented.

The brain also exhibits the pigmentary deposits. The cortical substance assumes a chocolate or black-lead-like hue, whilst the white matter remains unchanged, unless the amount of pigment be excessive, in which event the white matter presents a gray appearance, and its fine vessels resemble brown streaks. Under these circumstances microscopic examination shows the capillaries to be filled with black granules and scales.

The kidneys frequently participate in these changes. The cortical substance shows gray spots, and dark lines may be seen in the pyramids following the course of the bloodvessels. The microscope exhibits pigment matter in the capillaries of the cortical substance, and particularly in the Malpighian bodies, and sometimes isolated fragments are found in the uriniferous tubes.

The pigment is also found in the capillaries of the lungs. Dr. Frerichs says it is difficult to distinguish, in older persons, between the pigmentary deposits of another nature found in the lungs and those caused by malarial disease.

The pigment matter is found in abundance in the blood, and particularly in that of the portal vein, and is thence conveyed to the different tissues and organs in which it is discovered. The usual form is that of small, rounded, or angular granules, which are sometimes isolated, or more frequently connected together in groups by a pale substance, soluble in acetic acid and caustic alkalies. True pigment cells are observed along with the granules and granular masses, though in somewhat smaller quantity. They resemble in size and form the colourless corpuscles of the blood, or

they consist of larger spindle or club-shaped cells and rounded nuclei, with sharply-defined walls. These cells contain a greater or smaller number of black granules. The colour of the pigment is usually deep black, more rarely brown or ochre-coloured, and, least frequently of all, reddish yellow.

It is thought by most observers that this pigment matter is formed in the spleen. Dr. Frerichs is of opinion that, though there are many reasons for such a belief, there is no proof that it may not be formed in other portions of the vascular system. He believes, however, that there is no doubt the larger portion of the pigment is formed in the spleen.

In malarial disease, particularly, there is every reason to suppose that the spleen is the principal seat of formation of the pigment. During the congestions of that organ, which so constantly occur in this disease, the stagnation of the blood in the venous sinuses gives rise to changes which result in the formation of pigment in the masses of stagnant blood. Frerichs supposes that the club and spindle-shaped pigment cells are the epithelium of the lining membrane of the sinuses infiltrated with the decomposed red matter of the blood, that the globular pigment cells are colourless blood corpuscles infiltrated with molecules of colouring matter, and that the pigment scales are the broken-up fragments of the coagulum.

The results of these changes of the blood in the spleen are admirably drawn. One of the first effects is the production of chlorosis or anæmia, by the destruction of the red corpuscles, and no one who has seen the rapid advance of pallor in a case of unchecked or obstinate malarial disease can fail to be pleased with so admirable an exposition of the mode of production of the phenomenon. The pigment, carried by the spleen to the portal vein, and thence to the liver, is, in part, arrested in the capillaries of that organ, whilst other portions, consisting of the smaller granules and cells, pass on through the liver to the general circulation, and so reach the lungs, brain, and kidneys.

It is this retention of the pigment matter in the capillaries of the different organs by which Dr. Frerichs explains many of the symptoms which accompany certain of the severer forms of the disease. Thus, the retention of the coarser fragments in the capillaries of the liver, by clogging those vessels, gives rise to stasis of blood in the venous radicles of the portal vein. This stasis explains the intestinal hemorrhages and the diarrhœas which so frequently attend the more violent cases of bilious fever. In other instances, in addition to the effusions taking place from the mucous membrane of the alimentary canal, we have serous effusion into the peritoneal sac, occasioning ascites, a result similar in cause and symptoms to the ascites caused by cirrhosis.

The cerebral phenomena, the stupor, delirium, convulsions, or paralysis, which sometimes occur in miasmatic fever cannot, according to our author, be so satisfactorily shown to depend on the retention of pigment in the capillaries of the brain, as the intestinal hemorrhages, diarrhœa, and

ascites, have been shown to be the result of hepatic obstruction, but that a connection between the two does really exist, at least in some degree, can scarcely be doubted.

In many severe cases, it was found that the albuminuria and general dropsy present during life, evidently resulted from the obstruction to the renal circulation occasioned by the retention of pigment in the capillaries of the kidneys, and particularly in the Malpighian bodies.

Frerichs states that, "considering the great frequency of intermittent fevers, the cases in which there is a marked development of pigment are comparatively rare; hence, in such cases other agencies, of which we possess no accurate information, must co-operate with the usual causes of intermittent fever. In the present defective state of our knowledge as to the nature of infectious diseases, it cannot be determined whether a particular quality, or an unusual intensity of miasm, is necessary for the purpose." The cases which he has observed and published occurred after an inundation in Silesia, resulting from an overflow of the Oder, in 1854. Since that period cases of this kind have been very seldom observed, although the ordinary forms of intermittent fever are never absent. He remarks that a perfectly accurate diagnosis can only be made by direct examination of the blood. A few drops carefully collected are sufficient to show the presence or absence of large quantities of pigment. He usually collects it by means of a cupping-glass, care being taken to prevent the admixture of foreign matter.

The four cases given above are all well-marked examples of the disease, the pathological results of which Dr. Frerichs describes so well. The first case is one of simple intermittent, arising in one of the higher latitudes subject to marsh miasm, a form easily overcome by proper treatment in the early stage, and yet, even in this case, owing to its being allowed to run on unchecked for some weeks, we found in the blood of the patient, taken from the finger, the peculiar pigment granules described by Frerichs.

The other three cases were of a very different type. Originating in one of the lower latitudes, they exhibit a severity which gives us the opportunity of observing the serious consequences resulting from a dose of marsh miasm of the most poisonous kind. One of the three, though very ill when he reached the hospital, was saved by proper treatment. One was removed from the hospital in a condition which precluded all reasonable hope of his recovery. The third died. This case presented all the severest effects which result from the action of the malarial poison on the human economy; periodical fever, rapid loss of strength and flesh, with sudden production of anæmia, and, somewhat later, diarrhœa, ascites, anasarca in connection with albuminous urine, general cachexia, and death. With Dr. Frerichs's work before us it is easy to understand the successive steps of these changes. The congestion and stagnation of blood in the spleen explain, by the actual destruction of the red globules, the speedy induction

of anæmia. This condition is also greatly favoured, in all probability, by the failure of the globule-making function of the gland. As the destruction of the globules proceeds, their red matter is converted into pigment, which pigment, in its various forms, is carried into the vascular apparatus of the body. Deposited in the liver it may accumulate to such an extent finally as to impede the portal circulation and give rise to diarrhœa and ascites. Lodged in the vessels of the kidneys, and especially in the Malpighian bodies, it may cause a like impediment in those organs, and there is developed a true albuminuria with its consequent anasarca. In the third case given above we had all these conditions. Pigment in the liver, with diarrhœa and ascites. Pigment in the kidneys, with albuminous urine and anasarca.

The lessons as to treatment to be drawn from these discoveries are simple. The beneficent action of cinchona can scarcely be raised higher than before, but its precise mode of action is more clearly developed. Its antiperiodic power is that which makes it invaluable. By cutting off the paroxysms it prevents the repeated congestions and stagnations of blood in the spleen, and thus arrests the destruction of the blood in that organ, and the consequent production of pigment, which is the obstructive agent carried into the more distant organs of the body. The one most valuable therapeutic law taught by these facts is the necessity of applying the saving agent early in the case. When so used it averts the disastrous effects of repeated paroxysms, and thus saves life as clearly and distinctly as does a surgical operation in a case where no other course of procedure is possible. Reason deduces this result as plainly in the former case as the eye beholds it in the latter.

ART. II.—*On Tetanus Nascentium.* By J. LEWIS SMITH, M. D., Physician to the Infant Asylum; Physician to the Prot. Epis. Orphan Asylum, New York.

TETANUS NASCENTIUM, or, as it is sometimes called, tetanus neonatorum, or tetanus infantum, is one of the most interesting diseases of infancy. It stands first in point of time, in the long catalogue of fatal maladies; its advent is sudden and unexpected; life promising well, for such infants are usually robust, is destroyed in a few hours, turning the joy of parents into sorrow, and blasting their seemingly well-grounded expectations. Tetanus nascentium is also not a rare complaint, although it is more frequent in some localities and in some conditions of life than in others. In this city it is more common than tetanus at any other age, or indeed in all other ages, since, according to the reports of the City Inspector, more die

from tetanus in the first year of life than subsequently, and every physician knows that death from this disease, in the nursing infant, occurs, with very few exceptions, in the first two weeks of life.

Interesting and important as is tetanus nascentium, it must be confessed that our knowledge of it is much more limited and imperfect than it should be, when we consider what great advancement has been made in pathological inquiries during the present century. Our knowledge in reference to the causation, symptoms, and proper treatment of this disease, is not much superior to that of M. Dazille or Dr. Joseph Clarke, who lived before the year eighteen hundred.

Did we better understand the pathology of diseases in the new-born, or could we more accurately ascertain the condition of organs at this age, doubtless we should occasionally consider those phenomena, which we now designate as a disease, *per se*, under the title tetanus nascentium, as symptoms of some other affection. But as the tetanic rigidity and spasms in the new-born occur so abruptly, masking all other symptoms, and ordinarily ending so speedily in death, without our knowing certainly whether or not there is any antecedent disease, it seems eminently proper that we should recognize the state in which such muscular rigidity occurs, with such a rapid result as an independent affection.

This explanation is required from the fact that I have added to my collection of cases one from Billard, which this observer relates under the head of spinal meningitis.

I have felt more fully justified in employing the records of this case from the fact that others have recorded very similar cases as examples of tetanus nascentium. In Billard's case, an infant, three days old, was attacked with convulsions. "His limbs were rigid and violently bent; the muscles of the face were in a continual state of contraction." On the following day "the convulsions continued; * * * the body remained rigid, and the vertebral column, which the weight of the trunk will cause to bend, with the greatest ease, in a young infant, remained straight and immovable, whenever the child was raised." At the autopsy, in addition to the meningital apoplexy, which is commonly present in those who have died of tetanus nascentium, a thick pellicular exudation was found on the spinal arachnoid. This case certainly presented the symptoms and history which are characteristic of tetanus nascentium.

Fatal Cases.

Case 1. Male; taken when three days old; lived sixty hours. Labatt, Edin. Med. and Surg. Jour., April, 1819.

" 2. Female; taken when three days old; lived forty hours. *Ibid.*

" 3. Taken when five days old; lived fifty hours. *Ibid.*

" 4. Taken when three days old; lived one day. *Ibid.*

" 5. Male; taken when two days old; lived two days. Billard, Treatise on Diseases of Children, Stewart's trans., p. 477.

- Case 6. Male; taken when three days old; lived two days. Romberg.
- “ 7. Male; taken when six days old; lived ninety-three hours. Dr. Imlach, Month. Jour. of Med. Sci., Aug. 1850.
- “ 8. Female; taken at five days; lived four days. Caleb Woodworth, M. D., Boston Med. and Surg. Jour., Dec. 13, 1831.
- “ 9. Negro; taken at seven days; lived twenty-four hours. P. C. Gaillard, M. D., South. Jour. of Med. and Pharm., Sept. 1846.
- “ 10. Male; taken when seven days old; lived one day. Augustus Eberle, M. D., Missouri Med. and Surg. Jour., 1847.
- “ 11. Taken when seven days old. D. B. Nailer, N. O. Med. Jour., Nov. 1846.
- “ 12. Male; taken when three days old; lived one day. N. O. Med. and Surg. Jour., May, 1853.
- “ 13. Negro; taken when three days old; lived three days. Rob't H. Chinn, M. D., N. O. Med. and Surg. Journal.
- “ 14. Taken when two days old; died in four hours after the doctor's visit. *Ibid.*
- “ 15. Taken when seven days old; lived one day. C. H. Cleaveland, New Jersey Med. Rep., April, 1852.
- “ 16. Negro; taken when seven days old; death finally. Greenville Dowell, Amer. Jour. of Med. Sci., Jan. 1863.
- “ 17. Taken when twelve days old; lived one day. Thos. C. Boswell, communicated to Dr. Sims, Amer. Jour. of Med. Sci., April, 1846.
- “ 18. Taken when about five days old; died at about the age of nine days. B. R. Jones. *Ibid.*
- “ 19. Taken at or soon after birth; lived two days. Dr. Sims, Amer. Jour. of Med. Sci., April, 1846.
- “ 20. Taken at the age of six days; lived one day. *Ibid.*
- “ 21. Taken when three days old; lived two days. *Ibid.*
- “ 22. Male; taken at the age of eight days; died in three hours. Communicated to the writer.
- “ 23. Taken at the age of twelve hours; lived two days. Communicated to the writer.
- “ 24. Female; taken when seven days old; lived forty-five hours. The writer.
- “ 25. Male; taken at the age of seven days; lived about forty-eight hours. *Ibid.*
- “ 26. Female; taken at the age of eight days; lived three days. *Ibid.*
- “ 27. Female; taken at the age of five days; lived three days. *Ibid.*
- “ 28. Female; taken when four days old; lived two days. *Ibid.*
- “ 29. Taken when six days old; died next day. *Ibid.*
- “ 30. Taken when five days old; lived twenty-four hours. *Ibid.*
- “ 31. Taken when eight days old; lived two days. *Ibid.*
- “ 32. Male; taken when five days old; lived one day. *Ibid.*

Favourable Cases.

- Case 1. Negro; female; taken when three days old; recovered in a few days. Rob't S. Bailey, Charleston Med. Jour. and Rev., Nov. 1848.
- “ 2. Negro; taken at eleven days; recovered in fifteen days. W. B. Lindsay, N. O. Med. Jour., Sept. 1846.

- Case 3. Negro; taken when ten days old; recovered in thirty-one days. P. C. Gaillard, Charleston Med. Jour. and Rev., Nov. 1853.
- " 4. Male; taken at the age of eight days; recovered in twenty-eight days. *Ibid.*
- " 5. Negro; taken at seven days; recovered in fifteen days. Augustus Eberle, Missouri Med. and Surg. Jour., 1847.
- " 6. Taken when eight days old; recovered in four weeks. Furlong, Edin. Med. and Surg. Jour., Jan. 1830.
- " 7. Taken at the age of one week; recovered in two days. Dr. Sims, Amer. Jour. of Med. Sci., April, 1846.
- " 8. Female; taken at the age of three days; recovered in five weeks. The writer.

Period of Commencement.—Finckh, who saw cases of tetanus nascentium in the Stuttgard Hospital, states (*Hecker's Annalen*, vol. iii., No. 3, page 304) that it began in one case on the second day, in eight on the fifth, and in seven on the seventh.

Prof. Cederschjold, of Stockholm, treated forty-two cases in hospital practice, in 1834, and in these cases it usually commenced between the ages of four and six days; Copland says (*Medical Dictionary*) that it generally commences in the first seven or nine days after birth, and rarely later than the fourteenth. Romberg says that it commences between the fifth and ninth days. In two hundred cases observed by Reicke, in Stuttgard, in the course of forty-two years, it was never found to commence before the fifth, rarely after the ninth, and never after the eleventh day. Schneider says, that the disease occurs oftenest between the second and seventh, and rarely after the ninth day. In six cases reported by Dr. C. Lévy, of Copenhagen, it began in two on the third day, in two on the fifth, and in two on the sixth. Dr. Greenville Dowell (*American Journal of Medical Sciences*, Jan. 1863), who has seen much of the disease among the negroes in Mississippi and Texas, says it is almost sure to come on between the fifth and twelfth days after birth. In the forty cases collected by myself, the disease began as follows:—

Age.	Cases.	Age.	Cases.
One day or under . . .	2	Seven days . . .	8
Two days . . .	1	Eight " . . .	6
Three " . . .	9	Ten " . . .	1
Four " . . .	2	Eleven " . . .	1
Five " . . .	6	Twelve " . . .	1
Six " . . .	3		

Very rarely, as will be seen hereafter, tetanus nascentium begins at, or so soon after birth, that it may be properly called congenital.

Frequency in Certain Localities.—Tetanus nascentium occurs probably in all countries, but it does not add greatly to the mortality, except in certain localities. Some of the eminent British and Continental physicians confess to have seen so few cases, that they have almost no personal know-

ledge of the disease. On the other hand, there are, or have been places in every zone, where it is, or has been so prevalent, as to sensibly check the increase of population. The attention of the profession, more than half a century since, was directed to the prevalence of tetanus nascentium in the Island of Heimacy, off the coast of Iceland. On this island, scarcely an infant escaped, while on the mainland, scarcely one was affected. Heimacy, the product of volcanic action, of small extent, and almost destitute of vegetation, supports a scanty population. The inhabitants live chiefly on the flesh and eggs of the sea fowl, and are filthy and degraded in their habits. About the year 1810, the Danish Government deputed the land-physicus of Iceland to visit Heimacy, and ascertain the nature of the disease, which was so destructive to the infants. Although this gentleman from his brief stay saw no case himself, he obtained interesting particulars in reference to the disease, especially its great mortality from the priests and parents. At this time scarcely an infant escaped. Again, according to Dr. Schleisner, whose observations in reference to the same locality were made about fifteen years ago, this disease was still the most fatal of all infantile affections.

Tetanus nascentium is also represented as very fatal in the Island of St. Kilda, off the coast of Scotland. In the temperate regions of America and Europe, cases are not frequent, except occasionally in the poor quarters of the cities, in foundling hospitals, and rarely in country towns, where the conditions are favourable. The records of the Dublin, Stuttgart, and Stockholm Lying-in Asylums furnish many cases. In the town of Fulda, Germany, in 1802, Dr. Schneider saw six cases in fourteen days, while a midwife in the same place stated that she had seen more than sixty in nine years.

But the greatest mortality is in the warm climates, both of the Eastern and Western Hemispheres. In the West Indies, the Southern portion of the United States, the equatorial regions of South America, and in the islands of Minorca and Bourbon, it has, in many localities, been the most frequent and fatal of infantile maladies.

It is an interesting fact, that in the warm regions the victims are chiefly negro infants. L. S. Grier, M.D., of Mississippi, says, in the *New Orleans Medical and Surgical Journal*, May, 1854: "The first form of disease which assails the negro among us is trismus. The mortality from this disease alone is very great. No statistical record, we suppose, has ever been attempted, but, from our individual experience, we are almost willing to affirm that it decimates the African race upon our plantations within the first week of independent existence. We have known more than one instance in which, of the births for one year, one-half became the victims of this disease, and that, too, in spite of the utmost watchfulness and care on the part of both planter and physician. Other places are more fortunate, but all suffer more or less; and the planter who escapes a year with-

out having to record a case of trismus nascentium may congratulate himself on being more favoured than his neighbours, and prepare himself for his own allotment, which is surely and speedily to arrive." Dr. Wooten (*New Orleans Medical and Surgical Journal*, May, 1846), says, "It is a disease of fatal frequency on the cotton plantations in this section of Alabama." He has, however, never seen a white child affected with it.

In New Orleans, according to the death statistics in our possession, which, however, relate to only one year, tetanus nascentium is the most fatal of all diseases except phthisis. Mr. Maxwell says, in the *Jamaica Physical Journal* (copied in the *London Lancet*, April 11, 1835): "From observations that I have made for a series of years * * I found that the depopulating influence of trismus nascentium was not less than twenty-five per cent. It scarcely has a parallel within the bills of mortality." This gentleman's observations relate to the West Indies. Similar testimony comes to us from Cayenne and Demerara.

It is seen that the disease prevails in regions wide apart, and presenting very diverse climatic conditions; but there is a similarity, as regards the personal and domiciliary habits of the people, where its ravages are most felt. It occurs chiefly among those who are filthy and degraded in their habits, who live either from choice or necessity in neglect of sanitary requirements. And this fact aids us in an understanding of the subject which we shall next consider, namely—

Causes.—That uncleanness and impure air are a cause of tetanus nascentium is as fully demonstrated as most facts in the etiology of diseases. The attention of the profession was forcibly directed to this cause by Dr. Joseph Clarke, in a paper read before the Royal Irish Academy in 1789. This physician was in charge of the Dublin Lying-in Asylum, and had rightly concluded that the great mortality among the new-born infants was due mainly to imperfect ventilation. Through his advice apertures, twenty-four inches by six, were made in the ceiling of each ward; three holes, an inch in diameter, were bored in each window frame; the upper part of the doors leading into the gallery were also perforated with sixteen one inch apertures, and the number of beds was reduced. The result of these simple sanitary regulations may be seen from Dr. Clarke's own statement. He says: "At the conclusion of the year 1782, of 17,650 infants born alive in the Lying-in Hospital of this city, 2,944 had died within the first fortnight, that is, nearly every sixth child." The disease in nineteen cases out of twenty was tetanus nascentium. After the wards were better ventilated, namely, from 1782 till the time of the preparation of Dr. Clarke's paper, 8,033 children were born in the hospital, and only 419 in all had died, or about one in nineteen. So impressed was Dr. Evory Kennedy, who, at a later period, had charge of the same asylum, with the belief that Dr. Clarke had discovered the true cause, and had been able in a great measure to prevent it, that he exclaimed with enthusiasm: "If we except Dr. Jenner, I

know of no physician who has so far benefited his species, making the actual calculation of human life saved the criterion of his improvements." The ten cases occurring in my own practice, and which are employed in the statistics of this paper, were all met in tenement-houses or shanties, where habits of cleanliness are impossible, and I have not yet seen or heard of a case in the better class of domiciles. The statements of physicians in the Southern States, who speak from extensive observation among the negroes, are strongly corroborative of the idea that the disease is, in great measure, due to the cause which we are considering.

Dr. Greenville Dowell, residing in Brazoria County, Texas, believes that he has sometimes been able to trace the disease to the old bedclothes saturated with excrementitious matters, which are found in the negro cabins. In a well-written paper, published in the *Nashville Journal of Medicine and Surgery*, June, 1851, by Prof. John M. Watson, the frequency of the disease among the negroes is accounted for as follows:—

"When called to see their children we find their clothes wet around their hips, and often up to their armpits, with urine * * *. The child is thus presented to us, when, on examination, we find the umbilical dressings not only wet with urine, but soiled likewise with feces, freely giving off an offensive urinous and fecal odour, combined at times with a gangrenous fetor, arising from the decomposition, not desiccation of the cord."

Another cause is believed to be some irritation in the bowels; as from retained meconium. Observers in the Southern States, and elsewhere, occasionally mention this as a cause. In one case, treated by myself, there was obstinate constipation immediately before the attack, and in another diarrhœa preceded; and this or the state which produced the diarrhœa, was the only apparent cause of the disease.

In other cases the only assignable cause is exposure to wet or cold, or changes in temperature. Prof. Cederschjold attributed the epidemic, which he observed in Stockholm, to a sudden change of temperature, from hot weather, in May, to frosty, in June. In a case related by Dr. P. C. Gaillard, of Charleston, in the *Southern Journal of Medicine and Pharmacy*, September, 1846, the disease commenced as follows: The nurse came in with wet apron and clothes, in the evening, a short time after she had taken the child into her lap, it sneezed violently two or three times. At 10 P. M. tetanus began. The disease in certain localities on the continent is said to be more frequent where there is no parish church, in consequence of exposure in carrying infants to be christened. The influence of the weather, in the production of tetanus nascentium, is also shown by facts observed in the Stuttgard Hospital. In an aggregate of twenty-five cases, treated in that institution, all but three occurred in the cold months. In the Island of Cayenne, at a hamlet surrounded by mountains and dense forests, tetanus attacked only one in every twelve or fifteen of the infants. After a great part of the forests had been cut

down, so as to allow access to the cold sea winds, almost all the new-born infants fell victims to tetanus (Insel. Cayenne).

Hein relates, that a citizen of Berlin lost successively two children with tetanus nascentium. When the second child fell ill he observed that its cradle was exposed to a current of air. At the third accouchement the position of the cradle was changed, and the infant escaped. Exposure to wet and cold has been long recognized as a cause of the disease. Sauvages, many years ago, said, "Hic morbus hieme et cum aurâ humidâ saepius advenit quam sicca aestate." (*Nosol. Method.*, vol. i. p. 531.)

The causes of tetanus nascentium enumerated above may be proximate or remote; may produce the disease, by their direct effect on the system, or by producing a pathological state, which, in turn, leads to the development of the disease. There are other causes, which are always proximate, namely, organic alterations. In the bodies of those who have died of this disease, structural changes are found, which doubtless result from the spasms, and sometimes other abnormal states of organs, which, from their nature, could not be a result, and which being observed in different cases, must be regarded as proximate or immediate causes. The most frequent of such lesions is inflammation of the umbilicus and umbilical vessels.

Moschion, who lived in the first century of the Christian era, stated in writings still extant, that stagnant blood, in the umbilical vessels, sometimes produced dangerous disease in the new-born infant, and it is supposed that he referred to cases of tetanus infantum. In modern times the attention of the profession was more particularly directed to this cause, by a paper published by Dr. Colles, in the first volume of the *Dublin Hospital Reports*, in 1818. The observations published in this paper were made in the Dublin Lying-in-Hospital, during the period of five years. In each of these years he had witnessed from three to five post-mortem examinations in cases of infantile tetanus, and the lesions, he states, were in all much alike, as follows: The floor of the umbilical fossa was lined by a membrane apparently formed by suppurative inflammation, and in the centre of this fossa was a large papilla. This papilla consisted of a soft yellow substance, apparently the product of inflammation, and in all the cases the umbilical vessels were in contact with this substance, and were pervious. In a few instances superficial ulcerations were found near the mouth of the umbilical vein, and occasionally the skin, surrounding the umbilicus, was raised. The peritoneum covering the vein was highly vascular, though often not to a greater distance than an inch above the umbilicus; sometimes as far as the fissure of the liver. The peritoneum in the course of the umbilical arteries presented the inflammatory appearance, in still greater degree, often as far as the sides of the bladder. The cellular substance lying along the arteries and urachus, anteriorly, was loaded with a yellow watery fluid. The inner surface of the umbilical vein was not inflamed, but its coats, in general, were thickened. On slitting open the

arteries a thick yellow fluid, resembling coagulable lymph, was found within their coats, and in all cases these vessels were thickened, and hardened as far as the fundus of the bladder.

Dr. Finckh, who observed twenty-five cases in the Stuttgart Hospital, believes that the most frequent cause was suppuration, or ulceration of the umbilical cord. In ten of the twenty-five cases, the navel was dry and cicatrized; in the remainder, it was either wet or swollen, with a bluish red inflamed edge at the margin of the navel; a dirty viscid pus covered the umbilical depression. In all cases, in which the navel was not completely healed, it had a peculiar discoloured appearance.

Dr. Levy, physician of the Foundling Hospital, in Copenhagen, attended twenty-two cases in that institution, in 1838 and '39. Of these, twenty died, and fifteen were examined carefully after death. In fourteen there were decided marks of inflammation in the umbilical arteries, especially in those portions lying along the urinary bladder; in several cases the peritoneum over the arteries was much injected, and in three adherent either to the omentum or intestine by coagulable lymph; the coats of the arteries were thickened, their cavities dilated, and containing more or less dark reddish-brown, or greenish puriform matter, always fetid. Sometimes the arterial tunica interna was found ulcerated, and absent in places, and there was spongy thickening of the subjacent cellular tissue. In two cases the ulcerative process had extended from the tunica interna to the peritoneum, and in one had perforated even the peritoneum, producing a deposit of thick ichorous matter around the opening; in one case both arteries were so softened that their coats were scarcely distinguishable, and in another these vessels had become gangrenous. The appearance of the umbilicus was unchanged in four cases; in ten the fundus was red, and filled with puriform fluid, which quickly reappeared when removed, and in general, shortly before death, the navel presented a greenish colour.

According to Romberg, Dr. Schöller made post-mortem examinations in eighteen cases of tetanus nascentium, and in fifteen found inflammation of the umbilical arteries. These vessels were swollen near the bladder, in one case to the diameter of four lines, and were found to contain pus. The lining membrane was eroded, or covered with an albuminous exudation. Both arteries were not always equally inflamed, and in three cases only one was affected.

Schneeman found minute points of suppuration in the umbilical vein, in eight cases (*Holscher's Annalen*, vol. v. p. 484, 1840), and pus throughout the course of this vessel in one.

The observations mentioned above were made for the most part in hospitals on the continent, but there is a large amount of similar testimony furnished by physicians in private practice. M. Boiran, of the Isle of Bourbon, says he has found in every case inflammation around the umbilicus (*Gazette Médicale*, Paris, July 11, 1841). Dr. John Furlonge (*Edin-*

burgh Medical and Surgical Journal, January, 1830), who resided at St. Johns, Antigua, attributes the disease to improper dressing of the umbilicus. The same opinion is expressed by Mr. Maxwell, who also saw the disease in the West Indies (*Jamaica Physical Journal*, copied into the *London Lancet*, April 11, 1855). Dr. Ransom states, in a communication to Prof. John M. Watson (*Nashville Journal of Medicine and Surgery*, June, 1851), that he has never seen a case of tetanus nascentium, in which the umbilicus was healthy. In a case related by Robert S. Bailey, in the *Charleston Medical Journal and Review*, Nov. 1848, there was a hard scab on one side of the umbilicus, and this part was much distended. A discharge followed the removal of the scab, and the child recovered. In a favourable case, related by W. B. Lindsay, in the *New Orleans Medical and Surgical Journal*, Sept. 1846, the umbilicus was tumid, and not disposed to heal. Dr. H. O. Wooten (same Journal, May, 1846) attributes the disease to the condition of the umbilicus and umbilical vessels, and states that he has found the umbilicus gangrenous. A case is also narrated in the *New Orleans Medical and Surgical Journal*, May 1, 1853, in which the umbilical vessels were blocked up by purulent matter. Robert A. Chinn, M. D., Brazoria, Texas (*New Orleans Medical and Surgical Journal*, Sept. 1854), believes one cause of the disease to be improper tying and management of the umbilical cord, by which a diseased state is produced, which extends to the umbilicus and thence to the viscera. Dr. Dowell, of Texas, relates, in the *American Journal of the Medical Sciences*, January, 1863, a case in which the umbilicus was healed, but there was dark blood in the umbilical vein, and yellowness around the navel. Since observing this case, he has several times made post-mortem examinations, and in the majority of cases has found the same state of the umbilicus. At a meeting of the Obstetrical Society of Edinburgh, April 24th, 1850, Dr. Imlach related a case in which there was a dark and gangrenous appearance of the integument around the umbilicus, and the peritoneum underneath was also dark but not inflamed; umbilical vein healthy; a little fibrin in the left umbilical artery; right umbilical artery much diseased; its two inner coats apparently destroyed, and in their place a yellow pultaceous slough, in which pus-globules were discovered with the microscope.

It is evident that the pathological state of the umbilicus and umbilical vessels, described above, and which has been noticed by so many observers, in different countries, cannot result from the tetanus, for there is nothing in this affection which can possibly develop an inflammation. And if this were possible, so extensive lesions, as have sometimes been observed, would not be likely to occur in the short space of one or two days. The belief that these lesions precede and produce the tetanus is strengthened by well-known facts in reference to tetanus in the adult, since the state of the umbilicus in the one period of life is analogous to the wounds

which produce tetanus in the other. It is still further strengthened by the fact, which will appear further on in this paper, that tetanus nascentium, from being frequent in certain localities, has become infrequent through greater care in dressing and managing the umbilical cord.

But there are cases of tetanus nascentium in which there is no disease in or about the umbilicus. Dr. Finckh, of Stuttgart, made careful examination of the umbilical vessels in eleven cases, without discovering any pathological change. Dr. Samuel B. Labatt, Master of the Dublin Lying-in Hospital, published in the *Edinburgh Medical and Surgical Journal*, April, 1819, a paper entitled "An Inquiry into an Alleged Connection between Trismus Nascentium, and Certain Diseased Appearances in the Umbilicus." This paper was designed as a reply to the essay of Dr. Colles. Dr. Labatt relates several cases, in which there was no disease of the umbilicus and umbilical vessels, and others, in which the disease was so slight that it probably produced no injurious effect on the health of the child. Dr. James Thomson, who spent considerable time in the tropical regions, says (*Edinburgh Medical and Surgical Journal*, Jan. 1822): "I have, myself, examined nearly forty cases of infants that have sunk under the complaint. In many, I have looked at no other part but the navel, and have found it in all states; sometimes perfectly healed, especially if the infants had lived several days; at other times a simple clean wound. When death occurred on the fifth or sixth day, the wound was frequently in a raw state. I never yet saw it in a sphacelated condition." This writer concludes from his observations, that there are cases in which the cause is located elsewhere than in the umbilical region. In the *Dublin Journal of Medical and Chemical Science*, Jan. 1836, Dr. John Breen, criticizing the theory which locates the cause of tetanus nascentium in the umbilicus and umbilical vessels, remarks: "From dissections * * we have never been able to discover any peculiar morbid appearance which would justify us in offering any explanation of the pathology of the disease." In our own cases there was no evidence of disease of the umbilicus or umbilical vessels, so far as could be ascertained by external examination, and in one (No. 32) a careful post-mortem examination disclosed no lesion of these parts.

The inference from the above observations evidently is, that although umbilical disease is a frequent cause of tetanus nascentium, cases occur in which such disease is not present, and we must look for some other cause. From the nature of tetanus nascentium, the attention of observers has been largely directed to the nervous system, in the belief that sufficient cause of the disease might be found located there, and occasionally the correctness of this belief has been shown by post-mortem examinations.

We have alluded, in another connection, to a case from Billard, in which tetanic rigidity occurred in an infant three days old, as the result of spinal meningitis. That tonic spasms not infrequently occur in older children,

in consequence of meningeal inflammation, is well known, and in some of the reported epidemics of tetanus nascentium, meningitis was really present, and was probably the sole cause. Such an epidemic was observed by Prof. Cederschjold in Stockholm, in 1834. Within a few months, he treated forty-two cases, and in addition to the lesions, which are known to result from tetanus, there was found, in those examined after death, a plastic exudation at the base of the brain. Finckh, of Stuttgart, made twenty post-mortem examinations of those who had died of this disease, and in nine found spinal meningeal inflammation.

Meningitis in the new-born infant is, however, comparatively rare, and we must therefore regard it as not a common cause of tetanus.

Here comes up an interesting question, and one which a few years since attracted much attention. Can injury of the brain, or medulla oblongata from displacement of the cranial bones, during the birth of the child, or in consequence of pressure on the head from position after birth cause tetanus nascentium?

In 1846, there appeared from the pen of Dr. Sims, then practising at Montgomery, Ala., a paper designed to show that this disease is produced by pressure, exerted on the nervous centre through depression of the occipital bone. In 1848, the same writer published a second paper, also in the *American Journal of Medical Sciences*, fully enunciating his theory as follows: "That trismus nascentium is a disease of centric origin, depending on a mechanical pressure exerted on the medulla oblongata, and its nerves; that this pressure is the result, most generally, of an inward displacement of the occipital bone, often very perceptible, but sometimes so slight as to be detected with difficulty; that this displaced condition of the occiput is one of the fixed physiological laws of the parturient state; that when it persists for any length of time after birth, it becomes a pathological condition, capable of producing all the symptoms characterizing trismus nascentium, which are instantly relieved simply by rectifying this abnormal displacement, and thereby removing pressure from the base of the brain." In both papers cases are narrated in support of this theory, but there are serious objections to this mode of explaining the occurrence of the disease. In the first place, if this explanation were correct, tetanus ought ordinarily to occur sooner, for the occiput is as much depressed previously, and in the majority of cases more depressed, than at the period when it does actually commence. Compression of the medulla would certainly be followed by immediate and marked symptoms, instead of an immunity for four or five days.

Again, well-known facts, in reference to the causation of tetanus nascentium, conflict with Dr. Sims' theory, as epidemics of the disease, its prevalence in one locality, and absence in another, although no particular attention is given to the position of the infant, the diminution of the number of cases by greater attention to cleanliness, of which there is

abundant proof. Besides, there are many cases of tetanus nascentium, at the commencement of which there is no perceptible displacement of the occipital bone, and no scientific inquirer should assume to exist what is not apparent in order to support a theory.

A careful examination of the cases of Dr. Sims must convince any one who has seen much of the disease that there is no certainty that several of them are genuine, and there is a strong probability that some are not. Besides, other physicians have not derived that benefit from placing the infant on the side, which would be likely to result were the theory of Dr. Sims correct.

After the publication of Dr. Sims's papers, the attention of physicians in the Southern States, who saw much of infantile tetanus among the slaves, was directed to an examination of the correctness of his views, and though a few wrote approvingly of them, in the belief that his explanation held good in some cases, they were rejected by the majority. Drs. P. C. Gaillard (*Charleston Medical Journal and Review*, Nov. 1853), Wakly (*New Orleans Medical and Surgical Journal*, 1849), and Grafton (*New Orleans Medical and Surgical Journal*, July, 1853) relate cases in which there was no evidence of occipital displacement. In my own cases depression of the occipital bone was sometimes noticed, occasionally to a considerable extent, but in no instance did this depression seem to be a cause, but a result, and it became more and more marked as the disease advanced.

The correct explanation of the inequality of the cranial bones, sometimes observed in tetanus nascentium, is probably as follows: If the new-born infant becomes emaciated, the volume of the brain is diminished, like that of the trunk or limbs, and the sinking of the occipital bone simply corresponds with the amount of waste in the cerebral substance. Whatever the disease in the young infant, if there is much emaciation, the parietal bones will usually be found more prominent than the occipital. Now, in fatal tetanus nascentium emaciation is very rapid; those fleshy and plump, if the disease do not speedily end, become pinched and wrinkled. Viewed in this light, the occipital depression, so far as it has any effect, must be regarded as conservative. It prevents serous effusion, which, in a similar state of waste, occurs in older children, whose cranial bones are consolidated.

Hence the theory of Dr. Sims cannot be accepted; and yet there are a few cases on record in which tetanus seemed to be due to injury received at birth. Dr. Sims has related one such case, that of a negro infant. The mistress, an observing lady, gave to Dr. Sims the following account of it: Its head "was mightily mashed. . . . The bones seemed to be loose. I got it to take a little boiled milk on the first day; but it swallowed very little, and very badly, for its jaws seemed to be locked. On the next day it took spasms, and got stiff all over; its hands were shut up tight, and its arms were bent up so (she placed her forearms at right angles). Every

time I touched it the spasms would get worse all over, screwing up its face till it was the ugliest thing in the world; and when the spasms went off, it looked as well in the face as any new-born baby. But then the stiffness never left it, and the spasms kept coming and going till it died." It lived two days.

It is evident, from the description of the mistress, that this was a case of tetanus nascentium, commencing at, or so soon after birth, that it was really congenital. The apparent cause was injury of the head, occurring in consequence of protracted birth; the infant was resuscitated with difficulty after several minutes.

Dr. W. C. Sutton published a similar case in the *Nashville Journal of Medicine and Surgery*, April, 1853. The infant, at birth, was apparently dead, but was resuscitated so as to live eighteen hours in a state of tetanic rigidity. In these cases of congenital tetanus, doubtless, the cerebro-spinal axis is in some way affected; but, in the absence of *post-mortem* examinations, the exact nature of the injury is uncertain.

It is evident, then, that tetanus nascentium cannot be ascribed, abstractly considered, to any one cause. On the other hand, in different cases, the causes may be essentially distinct; so that the disease, as regards causation, corresponds with eclampsia in older children. Dr. James Johnson, many years ago, expressed his belief in the multiplicity of causes, and he had been a careful and intelligent observer in the West Indies.

The causes may be arranged in two groups, one external, the other internal. In the first group may be placed imperfect ventilation, personal and domiciliary uncleanness, and atmospheric vicissitudes; in the second group, so far as ascertained, inflammation of the umbilicus and umbilical vessels, meningitis, and, rarely, injury of the cerebro-spinal axis during birth. It is highly probable that in a large proportion of cases an external and internal cause are both present, the external preceding and producing the internal, and the internal in turn producing the tetanus.

Lesions resulting from Tetanus.—The lesions resulting from tetanus nascentium, most frequently observed in those who have died of this disease, are chiefly such as are produced by the arrest of circulation, which, as will be seen, occurs especially in the paroxysms.

In the cases examined by Prof. Cederschjold, of Stockholm, already alluded to, the vessels and sinuses of the brain, and the brain and spinal marrow, were gorged with blood; heart and large vessels filled with blood.

Careful autopsies were made by Finckh in the Stuttgart hospital, in twenty cases, the bodies at death having been placed on their faces, in order to prevent any deceptive appearance from the gravitation of blood. In four there was no appreciable alteration in the spinal marrow or its membranes. In the remaining sixteen there was an effusion of blood, in considerable quantity, the whole length of the spinal canal, between the bony walls and the dura mater. It should be stated, however, that there

was spinal meningeal inflammation in nine of the sixteen, though the effusion of blood did not probably result from the inflammation, but from the tetanus. The blood was very dark, sometimes fluid, at other times coagulated. In one case there was no change in the appearance of the brain or its membranes; in the remaining nineteen more or less extravasated blood was found on the surface of the brain or in its interior. The substance of the brain was healthy, as also its membranes, except the congestion. The only abnormal appearance observed in the thoracic and abdominal viscera was strong contraction of some portion of the intestinal tube in five cases.

Dr. West says: "The most frequent *post-mortem* appearance in these cases," referring to tetanus nascentium, "and that which I found in the bodies of all the four children whom I observed, consists of effusion of blood, either fluid or coagulated, into the cellular tissue surrounding the theca of the cord. Conjoined with this there is generally a congested state of the vessels of the spinal arachnoid, and sometimes an effusion of blood or serum into its cavity. The signs of congestion about the head are less constant, though much oftener present than absent, and sometimes existing in an extreme degree; while in one instance I found not merely a highly congested state of the cerebral vessels, but also an effusion of blood, in considerable quantity, between the skull and dura mater, and also a slighter effusion into the arachnoid cavity." Dr. Weber, of Kiel, also placed infants who had died of tetanus on their faces, and, without exception, found injection of the capillaries of the cord and spinal meninges, and extravasation of blood. M. Matuszynski, according to Bouchut, "has observed effusions of blood, of variable quantity, in the cerebral pia mater, in the ventricles, and in the choroid plexuses, with considerable injection of the membranes of the brain. He has also seen serous infiltration beneath the arachnoid, and serous effusion into the ventricles, accompanied by a diminution of the consistence of the cerebral substance." In two cases examined by myself, there was intense injection of the cerebral meninges and of the meninges of the upper part of the spine, but no extravasation was noticed. The spinal canal was not opened.

Dr. H. O. Wooten (*New Orleans Medical and Surgical Journal*, May, 1846) states that he has made several *post-mortem* examinations, and has found the pathological appearances as uniform as in any other disease, as follows: Engorgement of the substance of the brain, and of the meninges lining the base of the brain, the medulla oblongata, and spinal marrow; liver congested.

In a case related by Dr. Imlach before the Edinburgh Obstetrical Society, April 24, 1850, the upper part of the lungs was healthy, the posterior portion congested, and containing many dark points; heart and liver healthy; small intestines of a light-brown color; stomach and large intestines pale (there had been umbilical hemorrhage).

Romberg states that he found in a child, who had died of tetanus nas-

centium, such intense congestion of the veins and sinuses of the brain, that a slight touch, and the removal of the cranial bones, produced extravasation of the partly coagulated and partly fluid blood. Dr. Schöller, on the other hand, found actual extravasation of blood in the spinal canal in only one case in eighteen.

It is seen that while in some cases tetanus nascentium produces no sensible change in the condition of the viscera and vessels, it ordinarily causes great passive congestion, especially of the vessels of the cerebro-spinal meninges, and often extravasation.

Symptoms.—In many cases premonitory symptoms are absent, or are so slight as to escape notice. Sometimes there is a degree of fretfulness previously, but no more than is often seen in those who continue in good health. The first symptom which alarms the parents, and shows the grave nature of the commencing disease, is inability to nurse, or evident pain and hesitation in nursing. Commencing with rigidity of the masseters, the disease gradually extends to the other voluntary muscles, and in the course of a few hours the muscles of the limbs as well as of the trunk are involved. Persistent muscular contraction, which is the pathognomonic feature of the disease, is gradually developed in each affected muscle, so that it is not till after the lapse of several hours, perhaps even a day, that the greatest degree of rigidity is attained. Therefore, in the commencement of the disease, the limbs can be bent, and the jaws pressed open, by using a little force, though with manifest pain to the infant.

During the period of maximum rigidity, the jaws are fixed almost immovably, often with a little interspace between, against which the tongue presses, and in which froth collects. The head is thrown back, and held in one position by the stiffness of the cervical muscles. The forearms are flexed; the thumbs are thrown across the palms of the hands, and are firmly clenched by the fingers; the thighs are drawn towards the trunk; the great toes are adducted, and the other toes flexed. Occasionally opisthotonos results from the extreme contraction of the dorsal and posterior cervical muscles. The infant has sometimes been raised without any yielding of the muscles by one hand under the occiput and the other under the heels.

The rigidity is liable to variation in its intensity, even after the full development of the disease. If the infant is quiet, especially if asleep, the muscles are partially relaxed, to such an extent sometimes, in the first stages of the complaint, that the features have a placid and natural expression, though only for a short time. There are also frequent exacerbations in the muscular contraction, sometimes occurring without any apparent cause, and they are also produced by anything which excites or disturbs the child. Attempts to open the lips, or jaws, or eyelids, or to bend the limbs, blowing on the face, or even, sometimes, the alighting of a fly causes the paroxysm.

During the paroxysm the eyelids are forcibly compressed, as well as the

lips, which are either drawn in or are pouting; the forehead and cheeks are thrown into wrinkles, and the physiognomy is indicative of great suffering. The unnatural positions of the trunk and limbs, which result from the muscular contraction, are increased for the moment; the head is more forcibly thrown back, and the limbs more strongly flexed. The muscular movements, which occur during the paroxysms, are often called clonic spasms. There is, indeed, occasionally some quivering of the limbs, and yet, as I have on different occasions noticed, so far from their being clonic spasms the tonic character continues, and is merely intensified. In fatal cases, as the disease advances, the paroxysms occur more frequently until the period of collapse or exhaustion is reached.

There is not in tetanus nascentium any loud crying of the child, however great the suffering. The cry is variously stated by different writers as "whimpering" or "whining." It is of this suppressed character, from the fact that the respiratory muscles are so affected as to render impossible those strong and rapid respiratory movements which are necessary in full utterance of the voice.

During the exacerbation respiration is suspended or rendered imperfect, and the circulation is retarded to such a degree that general capillary congestion results. The surface becomes of a deep red, almost livid appearance. Sometimes epistaxis occurs as a relief to this congestion, and sometimes, though less frequently, the blood forces itself from the congested liver along the umbilical vein and escapes from the umbilicus. We have already alluded to the rupture of the capillaries so often observed within or upon the cerebro-spinal meninges.

The frequency of the pulse and respiration varies somewhat in different cases, and at different stages of the same case. They are often somewhat accelerated, but at other times are natural or are even slower than in health.

While the appetite of the infant, to appearance, is not diminished, the pain which it experiences in nursing is such that alimentation is necessarily deficient. It can be fed with a spoon for a time after it ceases to take food in the natural way, but artificial feeding soon fails. The milk placed in its mouth is, to a considerable extent, pressed back through the violence of the spasm, which is induced by the attempt to feed it.

In consequence of imperfect nutrition the infant rapidly wastes away. There is no other disease, except the diarrhœal affections, in which emaciation is so rapid. In a case related by Dr. W. B. Lindsay in the *New Orleans Medical Journal*, Sept. 1846, the record states that "the infant was fat three days before, but was now emaciated." Romberg, whose knowledge of tetanus nascentium is derived mainly from European hospitals, and Dr. Robt. H. Chinn, of Texas (*New Orleans Medical and Surgical Journal*, Sept. 1854), both speak of the rapid emaciation. The trunk and extremities lose their fulness, and the features become pinched. Several observers have noticed the appearance of miliaria in this reduced state of

system, especially around the shoulders, and sometimes a decidedly icteric hue appears on the skin.

The condition of the bowels is not uniform. Often they are loose, particularly if the disease is due to some irritation in the bowels; in other cases they are natural or constipated.

It is often difficult to ascertain the state of the eyes, since attempts to open the eyelids bring on spasms, and cause firm compression of the lids against each other. According to Sir Henry Holland one of the first symptoms which occurred in the cases on the island of Heimacy was strabismus, with rolling of the eyes. But this statement must be received with caution, since these cases were not seen by any physician, and the information was obtained from the parents and priests. If true, the proximate cause of the disease in Heimacy would seem to be located in the cerebro-spinal axis. I have seen the pupils contracted in the stage of collapse.

Mode of Death.—Death in tetanus nascentium may occur from asphyxia in the paroxysms, from extreme congestion of the cerebral vessels, or apoplexy; and lastly, it may occur from exhaustion. The last mode is probably the most frequent.

Prognosis.—All writers agree that tetanus nascentium rarely terminates favourably. Cullen attributes the ignorance of physicians, in reference to it, to the fact that it is so little amenable to treatment that they are not usually summoned to attend those affected with it. In the island of Heimacy, of one hundred and eighty-five cases, occurring during a series of years about the commencement of the present century, not one survived, and in the same locality, at a more recent period, according to the report of Dr. Schleisner already alluded to, sixty-four per cent. died. Similar testimony, in regard to the mortality of tetanus nascentium, is given by physicians in the Southern States. Dr. H. O. Wooten, of Alabama, says (*New Orleans Medical Journal*, May, 1846) that he has “never seen a decided case of tetanus nascentium that did not prove fatal, * * * and that it is very generally deemed useless to call in medical aid after the initiatory symptoms are well declared. Mr. Maxwell, speaking in reference to the West Indies, says (*Jamaica Physical Journal*, copied into the *London Lancet*, April 11th, 1835): “From observations, which I have made for a series of years, * * * I found that the depopulating influence of trismus nascentium was not less than twenty-five per cent. It scarcely has a parallel within the bills of mortality.” Dr. D. B. Nailer (*New Orleans Medical Journal*, Nov. 1846) says: “About two-thirds of the deaths among the negro children are from this disease, and so uniformly fatal is it that a physician is never sent for.”

Yet death does not always result. Eight of the forty cases in my collection recovered, but a correct opinion cannot be formed from this of the actual ratio of favourable to unfavourable cases, since recovery is so remarkable that favourable cases are much more likely to be published. In

the histories of these eight cases two interesting facts are noticed, which, when present, may serve as a ground for hope of a successful termination. These were the age at which the disease began, and fluctuation in the symptoms. With two exceptions these infants were about a week old when the initiatory symptoms appeared, and there were fluctuations in the gravity of the disease; whereas fatal cases ordinarily grow progressively worse. Yet in favourable cases the symptoms are never so severe as they become in a few hours in those who succumb.

Duration in Fatal Cases.—Of eighteen cases observed by Finckh, in the Stuttgard Hospital, fifteen died in two days, two in five days, and one in seven days. During the epidemic in the Stockholm hospitals, in 1834, where forty-two cases were treated, the disease seldom lasted more than two days. Romberg says: "It generally lasts from two to four days, but its duration is at times limited at from eight to twenty-four hours, and occasionally, though rarely, it extends from five to nine days."

In thirty-one fatal cases in my collection in which the duration is mentioned—

One lived	three hours.
Eleven others lived	one day or less.
Twelve " "	two days.
Four lived	three "
Three "	four "

Both Underwood, who published a little treatise on diseases of children in 1789, and Dr. Elsasser, at a more recent date, record fatal cases which were unusually protracted. The one described by Underwood was treated in the British Lying-in Hospital, and although all the others treated in this institution died by the third day, this lived six weeks; but it is suggested by the author that death was due, in part, to some other affection. The child treated by Elsasser lived thirty-one days.

Duration in Favourable Cases.—In the eight favourable cases in my collection, the duration of the disease, reckoned from the time when the infant ceased nursing till it began again, was as follows: In one case, two days; in one, a few days; in one fourteen days; in two, fifteen days; in one twenty-eight days; in one, thirty-one days, and in the remaining case about five weeks.

Diagnosis.—A physician, in one of the Southern States, some years ago expressed the belief that tetanus nascentium is often not recognized by practitioners in the northern part of the Union, so that it is more frequent with us than would appear from the bills of mortality. This is in a measure true. I have known it to occur in this city, and its true character not be suspected, although the means of diagnosis are more patent and reliable than in most other infantile affections. Permanent rigidity of the voluntary muscles, with temporary exacerbations, such as

have been described above, induced by attempts to open the mouth or eyelids, is pathognomonic.

Preventive Treatment.—While tetanus nascentium, if fully developed, is ordinarily fatal in spite of any remedial measures heretofore used, there is no doubt that great benefit may be gained by preventive measures in localities where the disease is common. This was shown by the great reduction in mortality in the Dublin Lying-in Hospital through the thorough ventilation introduced by Dr. Clarke. Dr. Meriwether, of Montgomery, Ala., says (*American Journal of Medical Sciences*, April, 1854): "When the disease appears endemically on a plantation, it may be arrested by having the negro houses whitewashed with lime inside and out, by raising the floors above the ground, by removing all filth from under and about the houses, by particular attention to cleanliness in the bedding and clothes of the mother, and in the dressing of the child, so as to prevent any of the matter from the umbilicus lying long in contact with the skin." Many physicians, especially in the Southern States, speak confidently of care in dressing the cord and attention to the umbilicus as a means of prevention. In the *New Orleans Medical and Surgical Journal*, July, 1853, Dr Grafton says that he has "never known the disease to occur in any child whose navel had the turpentine dressing." He uses turpentine as follows: "At the first time a few drops of the undiluted turpentine is applied immediately to the umbilicus around the cord, and it is anointed at every succeeding dressing, the turpentine being diluted one-half or two-thirds with olive oil, lard, or fresh butter." This use of turpentine has also been recommended by other practitioners in the warm regions.

Dr. John Furlonge, of St. John's, Antigua, believes (*Edinburgh Medical and Surg. Journal*, Jan. 1830) that no case would occur with the following treatment: "The cord when divided should be wrapped in clean linen. Every night for two weeks one or two drops of tinct. opii and spts. vini, equal parts, should be given, and castor oil with a little magnesia every morning. The child must be washed in tepid water every morning and the funis dressed." If this treatment is attended by the success claimed for it by Dr. Furlonge, so great care is certainly well repaid where a large proportion of the infants die of tetanus as at Antigua.

Some experienced observers go so far as to assert that it is possible to ward off the disease after the occurrence of symptoms which they believe are premonitory. Dr. Dowell says (*American Journal of the Medical Sciences*, January, 1863): "Some with slight twitchings of the muscles have recovered without any trouble, by being put in a mustard bath, washed clean, and put in a clean and well-ventilated cabin."

Treatment.—In considering the treatment of tetanus nascentium, the great difficulty which the child experiences in swallowing should be borne in mind. Without care, a considerable part of the dose is lost by the spasm of the muscles of deglutition, which ordinarily occurs when the

spoon is placed in the mouth; so that, without special attention to this matter, it may be uncertain whether the dose ordered is actually administered in full.

The treatment adopted by different physicians in this disease has been very diverse. Antiphlogistic remedies were employed by Finckh, but every case so treated was fatal. He states that whenever blood was abstracted, even in small quantity, the symptoms were aggravated. The result in the practice of other physicians, who have resorted to depletion, has been equally unsatisfactory.

The internal remedies which have been most frequently prescribed are opiates and antispasmodics. Furlonge, in a favourable case, gave laudanum in doses of one drop every three hours, alternately with two grains of Dover's powder. Woodworth also gave one-drop doses of laudanum; Eberle, one-sixth of a drop hourly. The opiate has generally been given in combination with an antispasmodic. The Dover's powder, given every three hours by Furlonge, was combined with five grains of sulphate of zinc. The hourly doses of laudanum, by Eberle, were combined with six drops of tincture of assafoetida.

When anæsthetics began to be employed in the treatment of diseases, it was believed that they would be especially useful in cases of tetanus. Accordingly, chloroform has been used in tetanus nascentium, with the effect of controlling the spasms during the time of its use, but without curing the disease. In Case 7, in the first table, it was employed several times, but apparently without delaying the fatal result. The editor of the *New Orleans Medical and Surgical Journal* states, in the May issue of that periodical for 1853, that he has used chloroform in tetanus nascentium, with the effect, he believes, of prolonging life. Anæsthetics certainly relieve the suffering of the infant, and on this account, even if they do not prolong life, their careful use is proper.

The administration of alcoholic stimulants is required, at short intervals, on account of the rapid emaciation and great prostration.

Local treatment directed to the umbilicus, in those cases in which there is evidence of inflammation of the umbilicus or umbilical vessels, should not be neglected. Vesication of the umbilicus, and the application of poultices to it, so as to promote discharge, have been followed by unquestionable benefit, if we may believe the statement of some observers who have made use of these measures. Dr. Meriwether, of Alabama, says, if there is no improvement from the medicine which he orders, he applies a blister larger than a dollar to the umbilicus, and with this treatment the child generally improves; a remarkable statement, since so few improve at all.

A warm foot-bath, repeated at intervals of a few hours, and stimulating embrocations along the spine, are proper adjuvants to the treatment.

In order to show what combinations of medicines have been used in

favourable cases, we will mention briefly the treatment of the patients in our second table.

Case 1. Warm water and laudanum to umbilicus. R.—Magnes. calcinat. ʒj; tinct. assafœt. gtt. lx; tinct. opii gtt. xx.—M. Dose, 20 drops, occasionally. Sweet oil applied to the limbs.

Case 2. Took magnes. calcinat. on the first day. 4th day, quin. sulph. gr. iij; morph. sulph. gr. ss; axung. ʒj to ʒij; applied to navel. 5th day, tepid bath every three hours; castor oil dressing to umbilicus. 6th, same treatment continued, and from this time gradually recovered.

Case 3. 2d day, a large warm poultice to abdomen. R.—Tinct. cannabis Indic. ʒij; aq. camphor. ʒij.—M. Dose, one teaspoonful every two hours. 3d day, treatment continued. 4th day, give same medicine every hour and a half. 5th and 6th days, treatment continued. 7th day, give same dose hourly. From this time recovered.

Case 4. 2d day, warm bath; poultice to abdomen. R.—Tinct. cannabis Indic. ʒss; syr. pruni virgin. ʒjss.—M. Dose, one teaspoonful every two hours. 3d day, dose one teaspoonful hourly. 4th, 5th, and 6th days, treatment continued. 7th day, dose one teaspoonful every half hour. 8th, 9th, 10th, and 11th days, half an ounce of cannabis given daily. From this time recovered.

Case 5. 3d day, blister two inches square to umbilicus, also blister to occiput. Hyd. chlor. mit. gr. iij, followed by castor oil. R.—Tinct. opii gtt. $\frac{1}{6}$; tinct. assafœt. gtt. vj; hourly. 4th and 5th days, treatment continued; is improving. 6th day, omit other medicine; give castor oil. 8th day, symptoms worse; blister to umbilicus. Give tinct. opii and tinct. assafœt. as before. R.—Hyd. chlor. mit. gr. ij, to be given with rhubarb and followed by castor oil. From this time gradually recovered.

Case 6. At first castor oil internally and warm applications externally, then a dose of calomel and jalap; a warm bath every three hours. 2d day, tinct. opii gtt. j every three hours; frequent applications of warm laudanum to the jaws; turpentine and mercurial ointment to be applied to the navel, from which the cord has dropped; the nape of the neck to be blistered, and the following powder to be given between each dose of the laudanum: R.—Pulv. Doveri gr. ij; zinci sulph. gr. v. 3d day, some improvement; a small quantity of camphor to be added to each powder; the blistered surface to be dressed with turpentine and mercurial ointment. This course of treatment was continued more or less regularly for three weeks. On the tenth day he took one grain of calomel and half a grain of James's powder. During the entire sickness only three grains of calomel were administered.

Case 7. This child recovered without medicine, being kept on the side, so as to remove pressure from the occiput.

Case 8. Recovered without treatment, except the use of mild laxative powders in the beginning of the disease.

It is probable that some of the remedial measures made use of in the foregoing cases were useless, and they may occasionally have been positively injurious; but as, in therapeutics, experience is our only safe guide, it is our duty to examine carefully the treatment of those who recover in a disease so generally fatal as tetanus nascentium. It is obvious that a physician called to a case should attempt to remove all those agencies or conditions which are known to produce tetanus nascentium, or at least to

favour its development, and which, when present, may serve to aggravate the disease. This requires attention to the state of the bowels and umbilicus, to cleanliness of the infant, of the bed and room, and to ventilation. It is only when this is done that we can hope for any good result from the internal and local treatment recommended above.

147 WEST FORTY-NINTH ST., NEW YORK.

ART. III.—*On the Use of Chloroform as an Internal Remedy.*

By A. P. MERRILL, M. D.

SINCE the publication of my *Lectures on Fever*, in which I have made frequent reference to the use of chloroform internally, I have received numerous inquiries upon the subject, which can best be answered, perhaps, by publishing more in detail some of the cases in which I have employed the remedy.

When it comes to be acknowledged, as I have little doubt it will be, that certain ailments commonly called blood diseases, are to be promptly relieved by a remedy which is supposed to act specifically upon the nervous system, there may be reason for revising some of the favourite doctrines of modern teachers. And when vascular engorgements are found to be more under control of neurotic remedies than the lancet, it will afford pathologists an apology for reconsidering certain dogmas hitherto well received. We may even venture to hope, that after the proper effects of chloroform are ascertained, better discriminations will be made in certain diseases between cause and effect. Fever, local congestion, and other forms of disease affecting the circulation of the blood, secretion, absorption, and nutrition may be traced to causes acting primarily upon the nervous system, the changes resulting to fluids and solids taking their places in the category of secondary effects.

But the true value of chloroform as an internal remedy, and the changes in theory and practice to be effected by its use, must be determined by more extended observations. I have witnessed its remedial effects in a sufficient number of cases to justify me in laying the subject before the profession, and with the hope that it may become the instrument of important improvements in therapeutics. It may not be too extravagant to expect the most beneficial effects from it in the inceptive stage of all forms of congestion from any cause whatever. When arising from the influence of local irritants, as in gastric engorgement, worms, teething, &c., it must of course be expected, that the relief obtained will not be permanent without the removal of the cause. But there is good reason to believe, that

even in such cases general convulsions and cerebral congestion may be suspended by full doses of chloroform, affording time and opportunity for the action of other remedies, and without which temporary relief death would be inevitable.

Such is the power of chloroform, when taken into the stomach, over every kind of convulsive movement, and such the certainty of relief to every form of congestion, that it would appear reasonable to infer that there is a necessary connection between the two, placing them in the relation of effect and cause. It is difficult to understand, otherwise, why in one case congestion should be relieved by the remedy, and why in another the same treatment should relieve, equally, the convulsive movement depending upon local irritation.

Objection is sometimes made to the introduction of unmixed chloroform into the stomach, on account of its highly excitant quality. But experiment proves it to be much less stimulating to the mucous membrane than to the skin, and in no case have I observed anything more than very temporary effects upon the mouth and throat, which soon subside. The vehicles we are advised to employ in its administration, can only hold the remedy in temporary suspension, and in most of the cases requiring large doses it is quite impossible for the patient to swallow them. Sometimes a single drop falling into the folds of the neck will cause vesication, while a fluidrachm passing into the stomach gives only a slight inconvenience by its stimulation of the mouth and throat. In the case of a child five weeks old, to whom I gave from one to three drops mixed in breast-milk, several times a day for five successive days, the tongue became red and a little swollen, and there was at times some difficulty in swallowing, but these troubles soon disappeared when the medicine was suspended.

As in the administration of other remedies, the dose of chloroform must be varied according to the nature of the case, and more than with most other remedies may be the range of quantities given. I have administered it in doses of a single drop to two fluidrachms, and have sometimes repeated it at short intervals; and I have reason to believe that the cases of infantile convulsions in which I have given from one-half to a full drachm, might have been relieved in the inception of the disease by fifteen or twenty drops. But when convulsions have continued for an hour or more, the smaller doses will have no perceptible effect. Indeed, relief in such cases is obtained only by such quantity as will produce sleep. As long as the eyes continue wide open there is only partial success, but when the eyelids close it may be considered evidence that the system is well under the influence of the remedy; and it sometimes happens that a considerable part of the dose is eructated, in the form of vapour, while the patient sleeps. The sleep continues from one to four hours, and is sometimes followed by great restlessness and jactitation for an hour or more, when the patient is at ease again and sleep returns.

CASE I. In the summer of 1852 I met a man on the street in Memphis in search of a physician for his child, who, he said, was suffering with a convulsion. I took him into my cab and drove with him about a mile, where we found a little girl about three years old in a violent and general convulsion, which some of the bystanders thought had continued with little abatement for three hours, but the parents of the child estimated the time at less than two hours. Her jaws were clinched, and there was foaming at the mouth. Believing the case quite desperate, I requested the attendant to seize and elevate the lips, into which I gradually poured a full teaspoonful of chloroform. It was some time in reaching the throat, but as it did so the child swallowed several times, and I felt assured the whole had reached the stomach. In about five minutes the fingers and toes were relaxed, and in a short time afterwards all the spasms ceased, the eyes were closed, and some of the attendants pronounced the child dead. The pulse, which had been until now wanting, slowly returned, and I sat by her for more than an hour watching the result; when the child opened her eyes and looking round the room with surprise at the number of persons present, called her mother and said, "Give me some bread and butter." I prescribed calomel, and for several days small doses of quinia, and she recovered.

CASE II. The same season I observed a crowd of men and boys in the street, and upon inquiring the cause was told a man was dying of sunstroke. With some difficulty I made my way to him, and found a strong athletic labourer lying insensible, foaming at the mouth, with stertorous breathing, cold feet and hands, eyes open, pupils dilated, and slow, feeble pulse. Having caused him to be turned upon his back, and wiped away the froth from his mouth, I poured from a vial into his clinched teeth a teaspoonful or more of clear chloroform, which after some delay he swallowed. The relief afforded was soon perceptible, and in half an hour he was so far recovered as to bear removal to a hospital, where he remained for several days and was then discharged, cured.

CASE III. Mrs. S., an elderly lady, very fat and plethoric, sent for me to prescribe for her in "a fit of cramp colic." She had been subject to such attacks for many years, but had always found relief in the use of her own remedies without medical aid. This attack had been more severe and longer continued than usual, and she had become alarmed. She was writhing with pain at the pit of the stomach, upon which she pressed violently with her hands. Her extremities were cold and purple, pulse barely perceptible, and eyes bloodshot. She had taken largely of laudanum, camphor, peppermint, and brandy, all which she believed had been vomited up. Sinapisms and hot footbaths had also been tried, and several active enemata. I gave her a teaspoonful of chloroform, which giving only partial relief, was followed in half an hour by as much more. In a few minutes after the latter dose, she complained of nothing but an inability to keep her eyes open, and expressed the fear that she might die of the effects of the chloroform in the impending sleep. But she soon slept in spite of herself, and awoke at the end of five hours quite well. Three years afterwards she told me she had had no return of the disease.

CASE IV. A man, aged about 30 years, represented to me that he was by trade a finisher, working mostly at a table, seated on a stool; that he was subject to epileptic fits, which generally attacked him while at his

work, and with only a few seconds' premonition. I asked him if he would have time to take a teaspoonful from a vial after the first sign of an approaching attack. He thought he should. So I provided him with an ounce vial of chloroform and a teaspoon, directing him to keep them always at hand while working. He told me some months afterwards that he thought he had warded off two attacks by taking each time when threatened a teaspoonful of chloroform, but that he had had several fits in spite of the remedy. A week or two after this conversation his wife came running to me in great excitement, saying, "O Doctor, the medicine you gave my husband has poisoned him, and he is dying." Upon inquiry I was satisfied he was only asleep, and giving this assurance, she returned to him. He afterwards informed me that, having mislaid his spoon, he had, on feeling a premonition of attack, seized the vial of chloroform and drank off its contents, but he had no definite idea of the quantity taken. He had slept about five hours without convulsion, and several months afterwards had not been again attacked.

CASE V. In the *Memphis Medical Recorder* for May, 1856, vol. iv., page 375, I made the following note: "A case of intentional poisoning, by taking six grains of strychnia, is related in the *St. Louis Medical Journal*, in which the patient was very promptly relieved by two doses of chloroform, a small teaspoonful each. Free emesis had, however, been previously produced by tickling the throat with a feather, which the reporter thinks could not have done much good, as the poison had already, and for a considerable length of time, produced its characteristic effects upon the nervous and muscular systems. The same journal contains a suggestion that chloroform is an antidote to lead-poisoning, in still smaller doses; but should there be good reason to expect antidotal effects in either case, we might venture to make a more sure use of them by increasing the quantity given, particularly in urgent cases."

In the succeeding number of the *Recorder* I reported the following case:—

"We had an opportunity recently to test the power of chloroform as an antidote to the toxic effects of strychnia in a patient who had taken an overdose of the latter, which had been prescribed for diarrhoea. From all accounts the dose could not have been a large one, but there may have been cumulative influences from previous use. At any rate the spasmodic action was violent, general, and long continued. A teaspoonful of chloroform was introduced into the mouth with difficulty, through the clinched teeth, which caused in a few minutes a perceptible degree of relaxation, accompanied by sensation of chloroform vapour from the stomach; but the spasmodic action continuing in the limbs, a second spoonful was administered, and in a few minutes afterward the patient was fully and permanently relieved."

This patient, as we now remember the case, was a girl about five years of age.

CASE VI. A daughter of Mr. C., of Memphis, aged about two years, was taken with a convulsion while riding in a little hand-carriage, supposed effect of a chill, although the child had not had chills previously. When I arrived her mother and others thought the fit had continued two hours. She had been several times in a hot bath, sinapisms had been extensively applied, and a physician was administering chloroform by inhalation with-

out effect. The pulse was barely perceptible, the eyes open and bloodshot, pupils dilated, skin of a purple colour, jaws clinched, fingers and toes tightly drawn inward, and the whole frame severely convulsed. I administered a teaspoonful of chloroform by the mouth, the physician present admonishing me of the probable violence to the mucous membrane and of her inability to swallow, and a few minutes afterward as much more was given by enema. Very soon she was quite relieved of all spasmodic action and in a sound sleep. A dose of calomel at night and quinia for several successive mornings completed the cure.

CASE VII. A child of Mr. M., in October, 1863, had a severe paroxysm of fever. The next day, while labouring under what appeared to be a slight chill, I prescribed for it. In half an hour afterwards the child was seized by a convulsion, which had continued about half an hour when I returned to it. I gave at once half a teaspoonful of chloroform, and in about ten minutes the child was relieved of all spasms and in a sound sleep. While thus sleeping the stomach and small intestines were distended with gas, attended by considerable rumbling, all which was partially relieved in about half an hour by free eructations of chloroform vapour. With the usual quinia treatment the child was soon well. It was about eighteen months old.

CASE VIII. In 1854, Mr. S., was seized with a severe chill, which, when I arrived, had continued about one hour. I found him covered with blankets and surrounded by hot bricks, drinking hot brandy toddy. He complained of pain in the head, was very restless, and groaned with internal distress. His eyes were red, his pulse depressed, and he had had two watery stools. I gave him a large teaspoonful of chloroform, removing at the same time all hot applications, and suspending the brandy. The chill soon subsided, and only slight febrile reaction followed.

CASE IX. Mr. M., of New York, was taken with a chill soon after rising in the morning. I found him by a large fire, shivering, restless, and complaining of pain in the head, back, and limbs. I gave him a teaspoonful of chloroform, and got him undressed and in bed. He was then only partially relieved, and the dose of chloroform was repeated. This relieved the chilly sensations, but he still had headache. Soon afterward he slept for an hour and awoke much better. Only slight febrile action followed. Quinia and arsenic were given and a recurrence of the chill prevented.

CASE X. A gentleman upwards of sixty years of age, long resident in a malarial region, had suffered frequent attacks of intermittent fever, and had used quinia until it seemed to have lost its effect upon him. Latterly his chills were obscure, and attended by partial blindness. I advised chloroform in doses of half a teaspoonful in the inception of his attacks. This always gave relief, and finally overcame the tendency to disease without any other remedy.

CASE XI. A young married woman about six weeks pregnant suffered with distressing attacks of asthma. Full doses of chloroform invariably gave relief.

CASE XII. One of the most remarkable of all the cases noted is that of Laura Bateman. This little girl, $5\frac{1}{2}$ years old, had been salivated to

such an extent as to cause the loss of considerable portions of the alveolar processes of the lower jaw, and her neck was scarred with scrofulous ulcers. She was taken with a convulsion on leaving the street cars with her mother on Sixth Avenue at 27th Street, and brought thence in a carriage to Leroy Street. On my arrival she had been uninterruptedly convulsed, as stated by her parents, full two hours—subsequently they estimated the time at three hours. The convulsive movement was very general, affecting the limbs, the fingers and toes, the muscles of the face and neck, the eyes, &c. Her hands were cold, but her feet were immersed in a hot mustard bath. No pulse could be felt at the wrist, the face, and especially the forehead, was dark with capillary congestion; the eyes were bloodshot and wide open, with dilated pupils; her breathing was laboured and stertorous; her jaws clinched, and she foamed freely at the mouth. She had evinced no sign of consciousness, had swallowed nothing, and had no other remedy than the mustard foot-bath. I poured full half a drachm of chloroform within her lips, which were elevated to receive it. It found its way slowly through the teeth, and was, with a convulsive effort, swallowed without any loss. In one minute all the convulsive movements were lessened, and remarked by the attendants. Still there remained considerable spasmodic action, and the eyes were unaffected. The dose of chloroform was repeated in a few minutes, and almost instantly her eyes were closed, and no spasm remained, except that her arms were straightened and rigid. As she slept, however, I did not repeat the remedy. Her pulse was now considerably excited, but soon after became slower and more regular, and I left her. The next day she showed little evidence of the fearful attack, except that one-half of one eye was still suffused.

On the thirty-fifth day afterwards, at the same hour, this child had another attack of the same kind. The convulsions had continued exactly two hours when I saw her, and she seemed more prostrate than in the previous attack. Besides being pulseless, and showing signs of extensive congestion, the pupils were more dilated, and there was rattling in the throat. The whole aspect of the case, indeed, impressed me with the belief that death was impending and inevitable. I gave her a full teaspoonful of chloroform, which was swallowed with some difficulty. Very little abatement of the symptoms followed, and the eyes remained open, with violent convulsive movements of the eyeballs. After waiting twelve minutes a half teaspoonful more of chloroform was given, and immediately the eyes were closed and the convulsions ceased. Still there was much rattling in the throat, the pulse was only perceptible, and her breathing so difficult at times that it seemed necessary to change her position to facilitate the entrance of air into the lungs. All these matters gradually improved, however, and in an hour and a half I left her in a quiet sleep. With the usual quinia treatment she recovered, but somewhat more slowly than before.

CASE XIII. In June, 1865, I was called, casually, to see a middle-aged lady said to be suffering with convulsions. I found her lying on the floor partially convulsed, her teeth clinched, insensible, eyes open, pupils dilated, convulsive twitchings about the face, groaning, and with both hands pressing firmly upon the epigastrium. She was very corpulent, with short neck and protuberant abdomen. I introduced into her mouth, with some difficulty, half a teaspoonful of chloroform, by which she was partially relieved and quieted, but remained insensible and speechless. Ten minutes afterwards

the dose was repeated, and in a few minutes she came to herself and said she was much relieved. She represented the attack as having been preceded by sensations of chilliness and fulness of the head, especially the occiput, but that she did not consider herself much indisposed. She had suffered in the same way several times before, and on one occasion relief was obtained only after five or six hours.

These few cases, taken pretty much at random from my practice in Memphis and New York, will serve to give those who have not tried it some idea of the power of chloroform over certain abnormal conditions of the nervous system; and, perhaps, the publication of them may induce other physicians to give more attention to the subject than they otherwise would have done, in which case my object will have been answered. The largest benefits are likely to result in cases of chill, enabling us, possibly, to overcome by this means the incipient stage of fever, even in its most fatal and epidemic forms; for, if the position taken in my published lectures be the correct one, in regard to the gradual accession of all forms of idiopathic fever, it may be hoped that a remedy, which so completely controls it in the cold stage, can be so used as to very much lessen if not prevent its necessary fatality.

I have not had proper opportunities for testing the efficacy of chloroform internally in cases of poisoning by strychnia, opium, and other articles which are supposed to act by causing congestion in the brain, spinal cord, ganglions and plexuses, but its effect upon congestion induced by the cause of fever is such as to justify the expectation that it will be found useful in these cases also. In gastric and uterine congestion, dysmenorrhœa and puerperal convulsions, I have reason to believe the remedy scarcely less efficient than in the cold stage of fever. And we may hope for good results from its use in apoplexy and paralysis. It should be at once popularized as a remedy for infantile convulsions and sunstroke, which often prove fatal before medical aid can be provided, and also in cases of gastric congestion from the use of cold water when the system is heated by exercise; and certainly no restraint should be imposed upon the sale of chloroform in small quantities by druggists.

ART. IV.—*Consecutive and Indeterminate Hemorrhage from Large Arteries after Gunshot Wounds; with Report of Cases treated by Different Methods; Appreciation.* By JAMES M. HOLLOWAY, M. D.

THE following remarks on hemorrhage after gunshot wounds are the result of four years' experience in positions where I enjoyed the peculiar advantage of attending personally to the management of cases in the

minutest details of treatment, and, at the same time, of observing those details as superintended by a large number of my colleagues. Did I possess the data necessary to furnish a tabular statement of this experience, I have no doubt but the results contained therein would, in the main, accord with those already published in the various journals, abstracts, and retrospects of the present day; leading us to the painful conclusion that hemorrhage, in its varied forms, is one of the most frightful and fatal complications to be encountered by the military surgeon. That it is, at the same time, a most interesting complication is none the less true; eliciting, as it does, the most earnest and assiduous attention, and calling into requisition the best energies of the mind. For the ligation of arteries, and all other means for the arrest of the fatal flow, successfully employed, secure for the surgeon a speedy and lasting claim upon the confidence of all with whom he is brought in contact. But, alas! how often is it the case, after the artery has been secured, and he is ready to flatter himself upon the performance of a brilliant operation, that the ulceration or slough extends, and the bleeding recurs; or the patient fails to react from the shock and anæsthetic influence and the loss of blood, or if reaction is established, the patient is left in so weak and anæmic a condition as to readily take on pyæmia, or, escaping that, yield, more slowly but none the less surely, to the exhausting effects of irritative fever consequent upon the enormous discharge of pus.

In order to be understood when alluding to different forms of hemorrhage it will be necessary to adopt one or the other of the various classifications set forth by writers, and I know of none more suitable than the following, which has been accredited to Prof. Henry Campbell, of Georgia, in his monograph on arteries:—

“In the foregoing paragraphs it has been seen how and at what period various forms of consecutive hemorrhages are occasioned; thus, retarded hemorrhage more frequently comes on within from five to twelve hours after receipt of the wound, and simultaneous with reaction or recovery from the general and local shock; intermediary, within from three to five days, with the dislodgment of the occluding clot and the increased circulation consequent upon advancing inflammation and tumefaction; while secondary takes place from the eighth to the fifteenth day, according to the artery wounded, and is occasioned either by the separation of a slough, opening into the calibre of the vessel previously injured, or by softening of the fibrinous adhesion in the mouth, or by the giving away of the walls of a traumatic aneurism;” and, “indeterminate usually takes place in gunshot wounds at a later period, when the danger of consecutive hemorrhage is supposed to have passed, in twenty, thirty, or forty days, or, indeed, at any time during the advanced stages of a severe wound.”

Before proceeding farther I deem it my duty to confess that my acquaintance with the medical literature of the past five years has been confined to the perusal of a few of the leading journals and abstracts, unavoidable circumstances having excluded me from the examination of late editions of standard authors. It may be, therefore, that the views I am about to present as the result of personal experience have been already confirmed and fully set

forth by these latter. If so, my evidence will tend to strengthen that already educed. Certain it is, however, that none of the contributors to leading journals, so far as I can ascertain, have evinced a disposition to depart from the old established rules for the treatment of consecutive and indeterminate hemorrhage involving large arteries. In spite of the frightful mortality, the tendency is still to follow in the beaten track, to adopt with blind faith the aphorism of Guthrie, "that arteries should always be tied if they bleed, and that always at the bleeding point;" or others, less bold, perhaps, insist upon the Hunterian plan, and would fain claim for it special advantages, such as were never dreamed of by its author. The employment of various styptics, constitutional and local, directly and indirectly, such as opium, quinia, tr. veratrum viride, ferri sulphatis, ferri persulphatis, ferri perchloridum, ice, the actual cautery, bandaging and compression, &c. &c., are recommended as adjuvants in the treatment of hemorrhage, but, as yet, no one of these remedies, nor their combined employment, has been set forth, so far as my knowledge extends, as sufficiently effective to justify their adoption in place of the ligature when large arteries are involved. These, with the ligature, are useful, without it, useless. And just here (without claiming originality) it is proper that I should announce the special objects of this paper.

Firstly. The application of the ligature to bleeding vessels, no matter by what plan, is, in many instances, not only futile but very injurious.

Secondly. The proper employment of astringents, both local and constitutional, together with compression, is oftentimes sufficient to arrest hemorrhage from arteries of large calibre until the natural process of repair has set up in and around the bleeding vessel.

Thirdly. A brief notice of this process of repair, and how it plays its part.

1st. If the Hunterian plan for the arrest of hemorrhage be adopted, it fails oftentimes because of the rapidity with which collateral circulation is established, pulsation below the ligature being distinct in a few hours. For example, the following :—

CASE I. Isaac Herring, private, 53d Regiment, Co. C; occupation, farmer; aged 24 years; general health good; wounded at the battle of Missionary Ridge, Nov. 25, 1863. Gunshot wound (minié) of left hand; ball entering palmar aspect between first and second metacarpal bones, near their carpal extremities, and lodging under the skin on the dorsum near the ulnar side of the metacarpo-phalangeal articulation of the thumb. The ball was extracted shortly after receipt of injury. He was sent to the rear by rail on the 28th, arriving at the hospital on the evening of the 29th. His wound commenced to bleed on the morning of the 27th at the field infirmary, and continued to bleed at intervals throughout the trip, and upon arrival at the hospital he was nearly pulseless.

Diagnosis.—Intermediary hemorrhage from the deep palmar arch.

Nov. 29. The brachial artery was ligated in its middle third by Dr. H——n, and the wound in the hand was cleansed and carefully dressed.

The pulse at the wrist was felt beating full and strong eight hours afterwards. Extensive inflammation of the whole hand followed, and was treated with cold applications. The hemorrhage did not recur. He was transferred to another post, forty miles distant, Jan. 26th, 1864. At that time the hand and forearm were still somewhat inflamed; pain severe; a deep-seated palmar abscess formed, and was opened; the wrist-joint has become ankylosed. He suffered from a mild attack of erysipelas, extending up the arm and over the face.

April 9. Being possessed of a powerful constitution he has been able to endure an unusual amount of suffering, and, at present, he is walking about his ward. The cicatrices in the hand have recently commenced to ulcerate, destroying the web between the index finger and thumb. His appetite is good. It may be remarked that the pain in the hand has been at times so severe as to resist all means employed for its mitigation, even the endermic application of large doses of morphia.

16th. The ulceration continues; a red line extends along the flexor aspect of the arm; hand œdematous; not painful upon pressure; ordered charcoal and cinchona poultice with a view to its cleansing and stimulant effect. Tension and long-standing inflammation of the tissues have destroyed their vitality.

20th. Ulceration has given place to sloughing with constitutional disturbance. Surrounding tissues red, swollen, and sensitive. Slight arterial hemorrhage occurred this morning. Countenance anxious, and pulse irritable. Ordered nitric acid to wound, and large doses of tr. ferri chlor. and chlorate of potassa.

21st. Neglected to take iron and potassa yesterday; another slight hemorrhage this morning; cleaned wound of slough and clots, and dressed with charpie steeped in turpentine; it seems disposed to take on healthy action.

24th. Hemorrhage recurred this morning at daylight, and was profuse; again at 10 A. M. The slough has extended over the thumb and invaded the metacarpo-phalangeal articulation. Wound cleaned and filled with persulphate of iron in powder. Applied light retentive bandage, and elevated the hand. Ordered opium, 1 gr., to be repeated as often as necessary to secure rest.

29th. Healthy action has returned, and the wound is granulating. The persulphate of iron has formed a firm plug, and is being gradually loosened and pushed out.

May 1. No more hemorrhage; wounds in good condition, and general health improving.

We will not follow the case further. It is very evident that ligation of the brachial, as well as ligation of the femoral, in Case No. II. (see further on), exercised no control over the hemorrhage, for the distinctness of the pulse eight hours afterwards leads to the conclusion that either there was a bifurcation of the artery high up or that the collateral circulation had been speedily established.

If the proceeding of Guthrie be resorted to, it often fails because of either an extension of the slough, the hemorrhage being secondary, or of ulcerative destruction of the arterial coats above the ligature and of the surrounding tissues, as in indeterminate hemorrhage. For example the following:—

CASE II. N. Parker, Corporal, 51st Regiment, Co. "B," occupation farmer; aged 40 years; general health good; wounded at Drewry's Bluff, May 16, 1864. Gunshot wound of left leg, ball entering to the inner side of tubercle of tibia and passing through that bone, made its exit through calf at a point two and a half inches below the wound of entrance. He was in the act of stepping forward on the limb. I saw the patient for the first time on May 23d. Had experienced no untoward symptom since receipt of injury; wound of exit nearly closed by granulation; of entrance, not discharging, and showing no disposition to fill up. Treatment, cold water dressings and rest in recumbent posture.

May 28. Slight hemorrhage from wound of entrance last night; patient states that it was black blood, inducing the belief that it proceeded from the cancellated structure of the bone.

29th. Bled again more profusely last night; decidedly arterial; again at daylight this morning; and again at 9 A. M. after a severe rigor. *Diagnosis*.—Secondary hemorrhage from the posterior tibial in its upper third, occurring on the thirteenth day after receipt of injury. The artery was ligated above and below the bleeding point. The lateral operation, as described by Druitt, was the one adopted; there was much delay in securing the vessel, occasioned by its great depth and the sloughing condition of the surrounding tissues; the incisions were necessarily extensive; shock from operation great; wound of exit in tibia stellated and spicula of bone protruded. Cleansed the wound, approximated its edges and applied roller bandage.

30th. Passed a sleepless night; reacting slowly; suffers from strangury, which was relieved by warm stupes and enemata; limb below the knee warmer than before ligature; temperature still less than normal; applied sand bags; administered three grains of quinia every two hours to ward off chill; nutritious diet and stimulants.

31st. Experienced another chill at 8½ A. M.; reacted without much fever; pulse depressed but regular; complains of severe pain in limb; discharge from wound, thin, dark, and very offensive; dressed with turpentine; prescribed quinia in sedative doses; stimulants and anodynes.

June 1. Seized with another chill at 11 A. M.; hemorrhage recurred, very profuse and exhausting; supposed to be from extension of slough. At 12 M. the femoral artery was ligated as it passes under the sartorius muscle; limb very much reduced in temperature compared with the other; cleansed wound and applied flannel roller from toes upwards, and dressed with Labarraque's solution; suffers severe pain throughout the entire limb. Continue constitutional treatment.

2d, 5½ A. M. Slept at intervals during the night; discharge from wound thin, unhealthy pus mixed with decomposed blood; very offensive; lips of wound sloughing. 12 M. Hemorrhage recurred. At the earnest request of patient the thigh was amputated in its lower third. The main arterial trunk required ligature. He failed to react from the shock of the operation, and died the same evening at 4 o'clock. He retained his intelligence until about one hour before death, and after the last hemorrhage insisted upon the amputation, otherwise I should have declined doing it. Examination of the amputated member showed an extensive slough, involving the artery above and below the ligatures, and the surrounding tissues. The parts above and below the seat of injury were healthy.

CASE III. (Special notes of this case were recorded by Dr. E. M. Seabrook, who performed the operation and continued in charge of patient afterwards. I can only give the prominent facts.)

E. F., soldier; aged about 25 years; general health good; wounded June 2d, 1864. Gunshot wound through left shoulder, ball entering in front and traversing the subclavian triangle. Profuse hemorrhage suddenly occurred on the evening of the 24th of June, twenty-two days after receipt of injury. The wounds had almost closed externally. *Diagnosis*.—Indeterminate hemorrhage from the subclavian artery. The anterior wound was enlarged and a ligature thrown around the artery above the bleeding point; operation performed by candle-light; the sense of touch was of great assistance in finding and securing the vessel; shock following the operation, which was tedious and attended with considerable loss of blood, very great. Another slight hemorrhage occurred a few days after, which proceeded from the transversalis colli; it was tied.

June 6. Patient died to day after another hemorrhage. *Autopsy* (made by myself): the surrounding tissues were completely disorganized; the first rib was fractured; the subclavian artery had sloughed throughout its entire extent and the first part of the axillary was invaded.

As points of interest we have in Case II. well-marked secondary hemorrhage occurring on the thirteenth day, caused by the separation of a slough in the artery, the result either of a contusion during the passage of the ball or of the presence of sharp spicula of bone that were protruding from the posterior aperture in the tibia; and the failure of ligation above and below the seat of injury because of the rapid establishment of collateral circulation. In Case III. we have well-marked indeterminate hemorrhage occurring on the twenty-second day, evidently the result of ulceration of the coats of the artery, for the parts were not in a sloughing condition at the time of the ligature. In both cases, we have great depression of the vital energies following the operation, a natural consequence of loss of blood and the protracted use of chloroform during the delay in finding and securing the bleeding vessel.

Other cases of a similar character could be furnished from my note-book, showing the difficulties and disappointments to be encountered by the military surgeon in his efforts to arrest hemorrhage from large arteries by ligatures. Our text books present us with beautiful guides for the ligation of arteries; and the inexperienced surgeon is induced to believe, when called to a case of hemorrhage, that he has nothing to do but make his incisions, look for the satellites, and pass the needle round the bleeding vessel. On the contrary, however, the very causes which generally give rise to consecutive and indeterminate hemorrhage are sufficient to wipe out all these carefully described landmarks. To increase the confusion, pulsation in the artery ceases oftentimes. For example, on the 24th of June, 1864, I assisted a very intelligent and skilful surgeon in the ligation of the left common carotid for secondary hemorrhage from the internal maxillary. There was great tumefaction of the jaw and cervical region. The hemor-

rhage had been profuse, leaving the patient in a very feeble condition. When I entered the room, the incisions had already been made through the inflamed tissues, but pulsation could not be detected, and it was impossible to find the artery until it was restored by the free employment of stimulants. The artery was finally secured after much delay and loss of blood, but the patient failed to react, and died the next day. On the twentieth of the same month I assisted another of my colleagues in the ligation of the right common carotid for hemorrhage from the internal maxillary. As in the other case there was great tumefaction of the parts, which together with the accidental rupture of a small branch of the superior thyroid vein, caused great delay in securing the vessel; the patient died in less than twenty-four hours. I did not in either case agree with these gentlemen as to the propriety of the treatment, but in one the operation was in progress when I was called; in the other my objections were overruled by a majority. I remember another case in which an attempt was made to ligate the posterior tibial artery by a surgeon who had already performed the operation on ten occasions; after much delay he succeeded in securing the vessel, but the patient died on the table.

In view of the above facts, I contend that as a general rule the Hunterian plan for the arrest of hemorrhage proves futile; and that even when the plan of Guthrie succeeds in arresting the flow, and when ulceration or sloughing of the artery and the surrounding tissues is controlled and nature is disposed to exert her reparative powers, the vital energies of the patient have been reduced so low by the repeated losses of blood previous to and during the protracted search for the artery and by the long-continued use of chloroform, and the severe shock, local and constitutional, consequent thereon, as to leave the way open for the supervention of pyemia or irritative fever, or exhausting diarrhœa, or all of these combined, either or all of which will most surely tend to a fatal issue. If, then, I have properly accounted for the frightful mortality following the ligation of arteries of large calibre for the arrest of consecutive and indeterminate hemorrhage; and if the above cases can be accepted as types—they are certainly corroborated by published statistics, and by the experience of those of my associates who have had the misfortune to encounter hemorrhage in all its varied forms—the question naturally arises, what mode of treatment should be substituted? This brings us to our next proposition.

Secondly. The proper employment of astringents, local and constitutional, together with compression, is oftentimes sufficient to arrest hemorrhage from arteries of large calibre until the natural process of repair in and around the bleeding vessel has set up.

Before citing cases in support of this proposition, I will give a brief history of the circumstances which first directed my attention to it. In 1855 and 6, while a resident student of the Touro Infirmary, and subsequently of the Charity Hospital, New Orleans, I attended a course of lectures delivered

by Dr. Warren Stone, Professor of Surgery in the University of Louisiana. The subject being arterial hemorrhage, he related a case in which the vertebral artery had been wounded by a sharp-pointed weapon. Its ligation being impracticable because of the deep situation and profuse hemorrhage, the graduated compress was resorted to with success. Another case in which the femoral artery had been wounded just below Poupart's ligament, on the field of honor. The necessary instruments for its ligation not being at hand, the patient was conveyed to the city in a furniture wagon, the hemorrhage, in the mean time, being controlled by his finger. After securing comfortable quarters and the requisite instruments, the compression was removed, but no hemorrhage followed. Intelligent and trustworthy assistants were directed to remain constantly at the bed-side of the patient to arrest the hemorrhage in case of its recurrence. Their services were not called into requisition, for the wound healed rapidly and the man recovered without an untoward symptom. Another case was brought before the class (I think it has been published in full) in which the gluteal artery had been opened by an incised wound; a large diffused aneurism resulted occupying the greater portion of the gluteal region. The sac was laid open by a free incision, the clots scooped out and the hemorrhage controlled by the finger. Upon examination it was discovered that the wound in the artery was too near its point of exit from the sacro-sciatic foramen to admit of its ligation, and the graduated compress was substituted with entire success. The facts set forth by these cases are instructive, and guided me in the treatment of the first case of consecutive hemorrhage that came under my care after the breaking out of the late war.

CASE IV. N. Saunders, private, 18th — Reg., Co. —, aged about 21 years; occupation, farmer; general health good; wounded at the battle of Ball's Bluff, Oct. 21, 1861. Gunshot wound of lower third of left leg, fracturing and comminuting the fibula. Three days after receipt of injury, patient rode on horseback from Leesburg to a country house distant about seven miles. I would remark that another soldier was admitted to the hospital at the same time, with a wound very similar to this in external appearance, but not involving the bone. This man was removed by his friends without my knowledge; and in the hurry and confusion consequent upon the admission of so large a number of wounded, the two cases were confounded, Saunders's wound being regarded the less severe; consequently no attempt was made to remove the spicula; cold water dressings were applied and rest enjoined. The case presented nothing worthy of notice until the tenth day, when suddenly profuse hemorrhage occurred. The next morning (Drs. J. T. Gilmore and K. C. Devine in consultation) we decided to enlarge the wound, and, if possible, secure the bleeding vessel. Upon making the incision, the above mentioned condition of the fibula was revealed. The hemorrhage being controlled by tourniquet in popliteal space, about five inches of the fibula were removed by the chain saw. The surrounding tissues were in a disorganized condition, and a fruitless search for the bleeding vessel was made. From the character of the hemorrhage, no doubt as to its proceeding from the posterior tibial can be entertained; though, I confess, such was my

inexperience at the time, I was anxious to regard it as capillary, in order to excuse myself for not finding and securing the artery. The wound was thoroughly cleansed, and filled with pledgets of lint steeped in a strong solution of tannin, and the inflammation subdued by cold irrigation; a roller bandage was applied from the toes to the knee, the foot elevated, and anodynes administered. Repair commenced in due time. There was no return of hemorrhage, and in about two months the patient was able to return to his home.

CASE V. James Egan, private, 10th — Reg., Co. —, native of Ireland; occupation, labourer; aged about 26 years; wounded in the battles around Richmond, June 30, 1862; was admitted into hospital July 2. Gunshot wound obliquely through calf of left leg, in its middle third. When admitted he stated that his wound had been bleeding, and his appearance indicated great loss of blood. He was made comfortable in bed, cold applications were applied, and stimulants ordered. No further notice was taken of the case until the next day, such was the demand for medical aid by those already admitted and who were awaiting operations. *Diagnosis*.—Intermediary hemorrhage from either the posterior tibial or peroneal, perhaps both. Hemorrhage recurred the next day (July 3); before the dressings could be removed and the flow checked, the patient fainted. It was deemed hazardous to attempt ligation, consequently a large, firm compress was applied over the track of the wound, and secured by a roller extending from the toes above the knee; the limb was elevated, and cold irrigation employed. This treatment, together with the use of anodynes and nutritious diet, was persisted in. One or two slight hemorrhages followed, but the patient made a good recovery. I saw him about six months after he left the hospital; one of the wounds had opened, and small spicula of bone were coming away from the posterior surface of the tibia; otherwise his health was good, and he enjoyed free use of his limb. Had I attempted ligation in this case, the patient would certainly have sunk under the operation.

The following case is so interesting and instructive, and, I might add, conclusive an argument in favour of styptics and compression, that, at the risk of appearing tedious, I transcribe it in full from my note-book:—

CASE VI. E. Hayne Davis, Captain and Inspector-General, aged 32 years; profession, lawyer; dark hair and eyes; low stature; weight 150 pounds; general health good; wounded at Fort Stedman, March 25, 1865, by shrapnel, fracturing and comminuting the bones of the right arm and forearm. Amputation of the arm was done on the morning of the 26th, at the field infirmary, supposed to be at the anatomical neck; the condition of the parts at the time of my examination did not admit of a positive opinion on this point. The upper and anterior edge of the incision was situated about one inch below and anterior to the junction of the middle and outer thirds of the clavicle. The patient was removed to comfortable private quarters in Richmond. Repair of the wound was very rapid, and unaccompanied by unpleasant symptoms other than occasional nervous twitching in stump; his appetite remained unimpaired, and there was no appreciable loss of flesh. On the 19th of April he took a long walk; at that time the wound was nearly closed externally. On the evening of the 20th, while sitting in the hall, he experienced tingling sensations in the arm, which were immediately followed by a gush of blood. Medical aid

was speedily obtained; the dressings removed; a small clot near the lower edge of incision was removed, and, after exposing the parts for a short time to the air, a compress was secured in the axilla by means of a roller. The patient informed me subsequently that, for three days before the hemorrhage, the discharge, which before that had almost entirely ceased, increased in quantity and was darker, and accompanied by a constant aching pain in stump. From this we concluded that ulcerative destruction of the tissues was going on, which, in the end, invaded the artery. Dr. E. F. Nichols remained with patient during the night. Hemorrhage recurred at 3 o'clock the next morning, and again at 6 A. M. Upon removing the dressings, extensive extravasation of blood was discovered in the axilla and anterior thoracic region. A consultation was called; present, Prof. A. E. Peticolas, Drs. E. F. Nichols, Thos. Maury, Henry Briscoe, and myself, all of whom agreed as to the diagnosis and treatment of the case, and who were made acquainted with the following notes of the case as I recorded them from day to day :—

Diagnosis.—Indeterminate hemorrhage from an aperture in the axillary artery, occasioned by ulcerative destruction of the coats of the artery and the newly-formed tissues surrounding.

April 21, 10 A. M. Pulse frequent and feeble; cheeks blanched from loss of blood; mind clear and calm; fully aware of the danger of his condition. Having been removed to a large and well-ventilated room, and placed upon the operating-table, a full stimulant was given, compression with the finger and key was made in the subclavian triangle, and the careful administration of chloroform was commenced by Dr. Briscoe; Dr. Maury was in charge of the knife. Before he became fully anæsthetized, the dressings were removed and the cicatrix laid freely open. The opening was then enlarged by an incision at right angles to this, extending obliquely downwards and inwards through the skin and great pectoral muscle. A number of large clots were scooped out, and, the cavity being empty, pressure upon the subclavian was removed, to secure a jet of blood to guide us to the bleeding point; the jet was easily obtained, and the blood welled up from the bottom of the cavity, which extended high up under the clavicle. Such was the disorganized condition of the surrounding tissues that no artery could be seen, and it was decided, without delay, that the search should not be prolonged, and that the best chance for the patient would be to plug the cavity with successive layers of lint saturated with a strong solution of persulphate of iron, well packed in, and secured by a figure-of-eight bandage. This was done. Prescribed opium gr. ij, quinia gr. x, to be taken at once.

22d. Has reacted fully; shows loss of blood; slight increase of heat in stump; slept well all yesterday and at night under the influence of the opium and quinia. Applied cold cloths to wound, and prescribed quinia gr. xv, opium gr. iij, in three doses; first to be taken at 11 A. M., and repeat every six hours. Concentrated beef-essence, milk-punch, champagne, and egg-nog *ad libitum*.

23d. Pulse 108; slept well since yesterday, rousing easily; mind lucid; some uneasiness in stump; clots dissolving, and discharge offensive. Applied Labarraque's solution; plugs to remain undisturbed; tongue slightly furred; relishes nourishment and stimulus; continue the quinia without opium; bowels not moved.

24th. Pulse 108; attacked with colic last evening, which was soon relieved by a large enema; annoyed also by uneasiness in stump. Took $2\frac{1}{2}$ grains of opium at 9 P. M., which secured rest, and he awoke this morning bright

and cheerful; skin cool and moist; appetite unimpaired. Soup and soft eggs. No hemorrhage; disorganized blood still exuding.

25th. Pulse 96, improved in volume; rested well during the night without opium; took one toddy at 12 P. M.; dressings undisturbed; disorganized blood still exuding, but its offensiveness is destroyed by the disinfectant; cheerful and hopeful.

26th. Removed the sponge that was placed over the plugs by saturating it with water, after which slight capillary oozing occurred, which proved to be superficial, and proceeded from the lips of the wound to which the sponge had adhered; changed his linen, and made him more comfortable; plugs still undisturbed; offensive discharge not so free, and slightly tinged with healthy pus. Commenced on yesterday at 12 with 15 drops of tinct. ferri perchlorid. three times daily. Continue free diet and stimulants.

27th. After changing outer dressing and bedding on yesterday, was seized with slight rigor, followed by fever, which broke up in a short time, leaving him with a moist skin; is troubled with a cough; slept tolerably well during the night; pulse 120, volume diminished; anemic, but retains his flesh remarkably; insists that he is improving. Removed all the dressings, allowing plug to remain; approximated lips of the wound with adhesive strips. Continue iron, veal cutlets, eggs, and brandy; of the latter he consumes about a pint and a half daily.

28th. Was annoyed by cough all yesterday, which was restrained by simple remedies; experienced another attack of colic, very severe and protracted, requiring powerful anodynes and antispasmodics; pulse 120; discharge of pus very free from stump, also from an opening at upper edge of cicatrix; plugs intact, but being pushed out by the granulations that are forming underneath; appetite still unimpaired; tongue rather dry and coated, resulting from the use of morphia; bowels moved by enema.

29th. Rested well all yesterday and last night, waking this morning refreshed, with a moist and clean tongue; losing flesh from night-sweats and increased drain of pus; plugs loosening from their attachments, and being gradually forced out; pulse the same. Diet, six eggs, soup, and veal; brandy *ad libitum*; increase dose of iron.

30th. The largest and most superficial plug came away last evening without force; another at 12 P. M.; one still remains; discharge of pus healthy, containing flakes of the styptic; pulse unchanged. Continue diet and stimulants.

May 6. Has gradually and steadily improved since last note, until yesterday morning was seized with severe lancinating pain in right side, which persisted, with distressing nervous symptoms, throughout the day; physical exploration of the chest could detect no lesion of the lung, and it is hoped that the attack is purely nervous, though strong suspicion of pyemia is entertained; suffers also with severe pain in the muscles of his jaw during mastication, which he states has been annoying him for several days; pulse irritable; relish for food impaired, which he attributes to the pain in his jaws; the pain in the side was controlled somewhat by anodynes and sinapisms and the external use of chloroform. Continue diet and stimulants.

7th. After pain subsided passed a pleasant night; respiration less painful; starts occasionally in his sleep; although one plug still remains the granulations are rapidly closing over it, the edges of the wound having been approximated by adhesive strips; pulse 112.

9th. Feels languid from colliquative sweats; pain and stiffness of mus-

cles of jaw increased and seriously interfering with his relish for food; no sign of inflammation internally or externally; no evidence of muscular spasm elsewhere; there is a marked increase in the discharge of pus, and it is freely mixed with flakes of the persulphate of iron, inducing the belief that the last plug is being forced out; the almost entire closure of the wound prevents its exit; the track of the wound, which is nearly filled up, and is very superficial, was cleansed by the syringe, and afterwards a weak solution of sulphate of zinc and laudanum was injected, causing considerable pain; the patient was turned upon his side and the shoulder well supported by broad adhesive strips. In the evening his linen was changed and he was removed to another bed, and his shoulders elevated. Prescribed tinct. cinchonæ and elixir vitriol; continue nourishing diet and stimulants.

10th. Rested well during the night; escaped his usual night-sweats; cleansed track of wound again and repeated the zinc lotion; discharge still tinged with the iron; complained still of pain and stiffness of the jaw; pulse irritable.

I took my departure from Richmond on the 11th, leaving the case in the hands of Drs. Nichols and Peticolas. Mrs. D., the patient's wife, writes me on the 16th of May: "Mr. Davis remained in about the same condition as when you left until last Sunday evening (14th), when he was considerably worried with coughing, phlegm in his throat, pain in his side, and severe pain in his shoulders; every now and then, during the evening and night, his shoulder would quiver and shake. On Monday morning (15th) Dr. N. left all the plasters off, the slit across being swollen and inflamed, and gaping, it having nearly closed before. About 9 A. M. matter commenced running at the end of the slit (the lower opening), which relieved the pain somewhat; the shoulder felt heavy and uncomfortable, though easier than it was on Sunday. Monday night Dr. N. probed the cavity and found the wad of cloth that you and Dr. M. said was there. On close examination he found an end of string shoving through the larger cavity; he caught it with forceps and commenced pulling it gently, and in ten minutes got out a wad as large as the last that came out (about the size and shape of a turkey's egg). Dr. N. had continued to syringe the track with warm water; this morning (16th) he found that the channel had closed. Mr. D. slept very well indeed last night, but was slightly under the influence of the morphia in the cough mixture; he complains of some little aching in the shoulder this morning; in every other way he is comfortable. His pulse has been 108 for several days. His jaws were somewhat better last Saturday, but they are sometimes better, then worse again." In a letter from the captain dated May 29th, he observes, "We expect to leave for home in ten days." We have then a history of the case up to the 29th of May, 38 days since the last hemorrhage. The plugs have all been discharged; the wound has filled and is closing rapidly.

In reporting these cases I have intentionally refrained from the selection of wounds of smaller arteries, to which the above plan of treatment is generally applicable, and I have also omitted to mention a number of cases of wounds of larger arteries successfully treated by my colleagues. It is to be hoped that if the attention of surgeons has been specially directed to similar cases, they will not withhold them from the public.

Before proceeding to the third point under consideration I would disabuse the mind of any one who entertains the impression that it is my object

to urge the substitution of compression and styptics exclusively for the ligature. It is sometimes the case when consecutive and indeterminate hemorrhage occurs, that the bleeding vessel is superficial and easily secured; under such circumstances the rejection of the ligature would be criminal. But, as a general rule, I repeat, the causes that give rise to such hemorrhage tend to render the artery friable, obscure, and, in many instances, inaccessible; in such cases a prolonged search with its necessary results, loss of blood, increase in extent of the wound, and the shock, will materially lessen the chances for the recovery of the patient.

We come then to the third point. How does repair take place after gunshot wound of arteries? What part is played in this process of repair by the artery proper and by the surrounding tissues? I would remark in the first place that gunshot wounds involving large arteries sometimes heal by first intention, *i. e.*, without suppuration; though such are exceptional cases. In the March number of the *Lancet* for 1863 a short paragraph announces that "a medal had been awarded to Mr. Colthorp for his report of a case of 'spontaneous closure of the axillary artery after gunshot wound.'" Nothing further is said on the subject, leaving us to conjecture as to the exact meaning of "spontaneous closure," though I presume repair took place by the first intention. Dr. Henry Briscoe, of Maryland, related to me the particulars of a similar wound where there was no hemorrhage after the first few hours and in which the repair was effected throughout the entire track without suppuration; there was no doubt as to the wound of the axillary artery. The following case came under my observation, and I transcribe it from my note-book.

CASE VII. Claude H. Dinkins, corporal light artillery, aged 31 years, merchant, health good, wounded July 18, 1864, near Petersburg by a sharpshooter. Gunshot wound (small minie ball which, after striking him, wounded his companion) through the left shoulder, ball entering behind on a line with and about two inches to the right of the posterior angle of the axillary crease, made its exit in front about one inch above the anterior angle of the axilla. A note from Dr. W. M. Nash, who saw the patient in camp a short time after receipt of wound, is as follows: "The axillary nerves are seriously injured, and indeed the artery does not seem to have escaped, though no hemorrhage has occurred; the impulse in the radial artery is very slight. July 20, near Petersburg.

July 23. I saw the patient for the first time this morning; he states that he has felt the pulse at the wrist occasionally and that at such times he experiences a sense of fulness, as if the arm was filling with blood. He states also that Dr. Palmer, of Florida, has examined him frequently since admission, and he thought he could detect pulsation at the wrist. Sensation perfect in the hand and arm, excepting numbness in the thumb. The wounds of entrance and exit are closed by clots; no discharge; no evidence of inflammation; complains of occasional pain in the hand. Removed to a tent and ordered moist dressings and rest in recumbent posture.

24th. Rested well under influence of morphia. I can discover no pulse at the wrist, nor at any point along the course of the vessel below the seat

of injury. Arm cool, pain not distressing; wound still dry and clots undisturbed. Dr. J. B. Gaston, of Ala., thinks he can discover a feeble pulse at the wrist.

25th. Suffering from nervous twitchings in arm and shoulder, which he mitigates by bathing the parts in cold water; clots dissolving; no sign of pus.

August 4. No change of interest has occurred since above note, the case progressing favourably; no pulse at the wrist nor discharge of pus from the wounds, which are now closed by scab; suffers, at times, with severe pain throughout the limb, or, as he describes it, "along the course of the nerves."

13th. Furloughed to proceed by easy stages to his home. Has not experienced an unpleasant symptom, excepting pain in the limb. The wound has healed throughout its whole track by McCartney's "modelling process," except at the orifice of exit, where on the 12th a small quantity (only a few drops) of pus formed after the scab had been removed through carelessness of the nurse. Pulsation below the seat of injury was not felt by myself at any time during the progress of the case, though repeated examinations were made. Last March I heard by letter that Mr. D. was enjoying excellent health, and that the wounds were entirely healed. Strength and motion of arm somewhat impaired. The long-continued absence of pulsation in the main branches below the seat of injury in this case forms, in my experience, an exception to the general rule.

Secondly.—In some cases, after the wounds have closed and repair seems to be complete, traumatic diffused aneurism results, owing oftentimes to disturbances in the general health, and sometimes occasioned by premature exercise. A case of this kind came under my observation last August, in which the axillary artery had been wounded. Upon examination, three weeks after receipt of the injury, I detected a distinct bruit under the clavicle; the wound had closed, and until that date no suspicion of aneurism existed, and the patient had not been confined to his bed. His general health being very feeble on account of long exposure to miasmatic influence, it was deemed advisable to send him to the country, with the understanding that he would return in a short time and submit to an operation. He never returned, and in answer to a letter of inquiry his postmaster informs me that he "died four months after his return home from the bursting of an abscess in the upper part of the chest, which discharged a large quantity of blood." In view of the above case, it might be urged by some, as an objection to the treatment of consecutive hemorrhage by compression and other styptics in place of the ligature, that there would be a greater danger of the formation of traumatic aneurism. Admit the truth of this, still the occurrence of so unfortunate a complication would not serve as an argument against this plan of treatment; for the object in view is to rescue the patient from immediate danger, and so husband his strength as to enable him to escape entirely or outlive any complications; and, should an aneurism form, a subsequent operation for

its relief could be performed in sound tissues and on a comparatively sound subject.

Thirdly.—Wounded arteries of large size do not always bleed, even when lying in a mass of sloughing tissues. For example, the following cases, furnished by Dr. J. C. Baylor, of Norfolk :—

CASE VIII. J. W. Dinguid, Lieut. artillery service, wounded by minié ball on the first of June, 1864. Femoral artery severed in its lower third; no consecutive hemorrhage; died June 15th, fourteen days after injury. *Autopsy.*—No effort at repair; gangrene of foot had commenced; the wound in thigh a sloughing mass.

CASE IX. W. D. Thompson, private, 5th cavalry, Co. E, aged 40 years. Gunshot wound (minié) of knee-joint, ball entering outer portion of popliteal space, traversing inner condyle and emerging at inner side of joint. Popliteal artery completely severed; no consecutive hemorrhage; no effort at repair in wound. Wounded May 3d; died May 18th, thirteen days after.

The doctor did not incise and examine the severed ends of the arteries. It would have been a matter of interest if he had ascertained by what means the mouths of the vessels were closed. These cases are exceptions to the general rule.

Fourthly.—In gunshot wounds involving arteries repair usually takes place by granulation. This process is accomplished much sooner than the repair which is going on inside of the wounded artery. This throwing out of plastic lymph and its organization outside and independent of the artery, serves as a provisional obstruction to the escape of blood until the absorption of the secluding clot and the dwindling of the artery to the condition of a cord takes place. This must be the case to a greater or less extent when a ligature has been applied. But we must admit that a ligature which has divided the internal and middle coats and is cutting its way through the external coat by ulceration, must by its presence seriously retard healthy action in the surrounding tissues. We have already seen in the above cases how the ulceration or sloughing, as the case may be, extends beyond the point of ligation, and experience teaches us that hemorrhage is most apt to recur about the time of the separation of the ligature. How much more rapidly and effectually, then, must this repair of the tissues go on when, in place of the ligature, a broad, firm compress is applied, which, instead of dividing and constricting the external coats, merely coaptates them, and which, when properly applied, does not interfere with the granulating process, nay, rather stimulates healthy action in the flabby, or ulcerating, or sloughing tissues. Case VII. furnishes a good illustration of this, where the plugs were actually shoved out by the rapidly-forming granulations. As an evidence of the difference in the rapidity of repair inside and outside of the artery, we might allude to the manner in which traumatic aneurism is formed after gunshot wounds. The wound has healed, as in the case mentioned above; the provisional

plug of healthy granulations has formed; it is still delicate, but sufficient under ordinary circumstances to prevent a recurrence of hemorrhage; the patient takes an undue amount of exercise; the column of blood presses against this plug, which widens and expands, and for the time forms in part one of the coats of the aneurism. The tissues, although incapable of opposing a resisting barrier to the increased impulse of the blood, instead of breaking down at once, gradually retire before the accumulation, and only yield when the attenuated wall is incapable of further expansion. I remember the case of a soldier who was wounded in the leg at the battle of Chancellorsville, May 3, 1863. The posterior tibial in its upper third was involved; the wound had nearly filled by granulations; compression along the track of the wound was employed. There had been no hemorrhage for eighteen days, when an officious attendant probed the wound of entrance with his finger, and upon withdrawing it a large jet of arterial blood followed. Compression was again employed, but the man died about two weeks after of a supervening disease. I regret that circumstances prevented a *post-mortem* examination.

By reference to the details in the treatment of the above cases, the particular remedies used as adjuvants to compression will be found fully described. My preference for the persulphate of iron is great. It is prompt in its action and not irritating. I use it either in powder or in saturated watery solution, generally filling a bleeding cavity with alternate layers of lint and the powder. I have yet to see any bad effects, local or constitutional, from its use. During the summer of 1863 it was used extensively by Drs. Clarke and Baker, of Alabama, as a local application to sloughing wounds. They filled them with the powder, the effect of which was a rapid solidification and separation of the sloughing mass from the surrounding parts; it seemed at the same time to hasten healthy action. In capillary hemorrhage, accompanied by great constitutional disturbance, its application is almost specific. In August, 1864, I was called to a soldier whose wound was bleeding profusely; the integuments on the internal and external aspects of the thigh had sloughed and the muscles were cleanly dissected; the femoral artery was exposed, but uninjured. The muscular interspaces and the whole cavity were filled with the dry powder and a roller bandage applied. I left the further management of the case to one of my colleagues, who informed me that in twenty-four hours all constitutional disturbance ceased, no further hemorrhage took place, and the man was rapidly recovering. I find cold irrigation of great service, when persistently employed, also elevation of the limb when practicable. Opium and quinia, in full doses, are the best constitutional remedies.

LOUISVILLE, KY., June 10, 1865.

ART. V.—*Retroversion of the Impregnated Uterus, with a Case, occurring between the Fourth and Fifth Months of Pregnancy.* By DAVID PRINCE, M.D., of Jacksonville, Illinois. With a wood-cut.

THE discrepancy of opinions found in the text-books upon midwifery, regarding the proper method of replacing retroversion of the impregnated uterus, is a sufficient apology for reporting the following case. Erroneous opinions as to the cause of the malposition may do but little harm, but the importance of correct *practice* cannot be over-estimated.

The cases of persistent retroversion are so rare that many physicians of large practice have not met with a case, and, perhaps, the unsettled practice may be owing to the infrequency of the accidents.

Contrary, however, to the opinion which has been generally entertained, Prof. Hodge, in his magnificent work on Obstetrics (p. 413), says :—

“Retroversion of the uterus is very common during gestation, much more so, we believe, than is generally supposed, especially during the early stages. The author has met with innumerable examples.”

Rigby furnishes, in his *Midwifery* (p. 126), an excellent history of this displacement.

Pressure from distension of the bladder is by many regarded as a cause of retroversion, but this writer thinks that distension of the bladder is an effect and not a cause of this displacement. External violence and the action of the abdominal muscles may press the fundus below the promontory, when it will pass lower to find greater space in the concavity of the sacrum. Then accumulation of urine in the bladder from pressure of the os upon the urethra, and accumulation of feces in the rectum from pressure by the fundus, will tend to fix the uterus in its new position.

This view of the succession of events is supported by the statement that pain, probably from the stretch of uterine attachments, is felt in some of the cases in which the accident occurs suddenly, from action of the abdominal muscles, before those distressing symptoms arise which depend upon distension of the bladder.

The relaxation of the uterine ligaments is plainly necessary to retroversion, both in the unimpregnated and the impregnated state. Without this relaxation the uterus can incline neither forward nor backward. The uterus, again, is so attached to the bladder, that when this organ is full, it must cause the uterus to hug closely to it, and be carried with it, up to the superior strait of the pelvis. It is in this view, clearly impossible that a distended bladder should be the immediate cause of retroversion. The distension of the bladder must, however, put the round and the broad ligaments upon the stretch; and if they fail to retract upon the emptying of the bladder, the uterus has lost its props, and may tumble over, if

forcibly pushed by the intestines, suddenly crowded down by the abdominal muscles.

This explanation has been clearly made by Prof. Meigs, in his *Woman and her Diseases*. In this view a retroversion may occur so soon after the discharge of urine from a distended bladder, that the distress of the retroversion may follow that of the retention of urine so closely as to have no interval in the memory of the patient.

It is easy to conceive that a *retroflexion* might occur in connection with a distended bladder, the fundus of the uterus doubling down upon the lower part of its body and its neck, while the latter is hugged closely upon the posterior surface of the bladder. A retroflexion might also become a retroversion by the straightening out of its long diameter in the process of enlargement in the development of the ovum.

While, then, the accumulation of urine in the bladder may predispose to retroversion by elongating the ligaments; the retroversion may afterwards cause retention by the compression of the urethra between the os uteri and the symphysis pubis. At length, as the os rises into the abdomen above the pubis, the urethra ceases to be compressed, and is only elongated, while the capacity of the bladder may be diminished by the position of the mouth and neck of the uterus. If, however, in this last case, the pressure of the os uteri upon the brim of the pelvis comes below the entrance of the ureters, the bladder may be still greatly distended, as was the condition in Hunter's case, a drawing of which is copied in *Rigby's Midwifery*, and in *Bell's Anatomy*.

Dr. Hodge ascribes the malposition to relaxation of the ligaments from distension of the bladder, a loaded condition of the intestines, and contraction of the abdominal muscles. He thinks, contrary to the opinion of Dewees, that a previously retroverted uterus is frequently impregnated. If spontaneous reposition fails to take place, an early abortion may occur from the continued influence of the tense vagina upon the os uteri.

Treatment.—Dr. Weir, of Glasgow, reduced a retroversion by pressure upon the fundus and a *pull upon the mouth*.

"After much difficulty," he says, "and a great degree of force, and in opposition to the strong and powerful exertions of the patient, which all tended to prevent its admission, I succeeded in getting my hand into the vagina, forced up my finger above the pubes, and reached the mouth of the womb. An assistant, at the same time, got his hand into the rectum, and we had thus the perfect command of the patient. By steadily pushing upward the fundus, and cautiously *pulling the mouth and neck of the womb downward*, the tumour was gradually raised above the promontory of the sacrum and the uterus reduced to its proper position."—*Glasgow Med. Journ.*, vol. i. p. 268.

Prof. Meigs quotes this treatment with approbation, and makes no criticism of the expedient of pulling down the neck of the uterus. While the length of the uterus is limited to the antero-posterior diameter of the pelvis, the plan of depressing the os may be well enough, but when the os uteri is

pushed firmly against the pubis, and especially when it rides above the pubes, any pull upon the mouth of the womb must be so much force worse than wasted, crowding the fundus all the more firmly into the hollow of the sacrum and requiring a greater lifting force to carry the fundus above the promontory. The period of pregnancy in this case was about the fourth month.

The uterus is uniformly described as forming a lodgment in the hollow of the sacrum, the promontory of which constitutes an impediment to the elevation of the fundus into the abdomen. It would seem, therefore, that the *point* is, to raise the fundus above the promontory. If a pull upon the neck of the uterus crowds the fundus more firmly into the hollow of the sacrum: then this traction is a force which impedes the elevation of the fundus, and is therefore worse than useless. Dr. Rigby, in his *Midwifery*, expresses similar views.

Though this might seem sufficient to settle the chief point of treatment, as consisting in elevation of the fundus without depression of the os, we may quote as authorities in favour of pulling down the os uteri, Burns (*Midwifery*), and Bedford (*Obstetrics*).

Meigs, in his book quoted above, describes and figures a ring upon the end of a rod, by which he lifts up the fundus, and by having two of them, he can hook one upon the cervix and pull down, while with the other he can push upward upon the fundus. He quotes from Moreau a case in which the posterior wall of the vagina was ruptured in the process of reduction, and the woman died.

Perhaps the knowledge of some such catastrophe may have led Denman to enjoin that only mild means should be employed, without describing what those means should be, further than the emptying of the bladder. He thought the enlargement of the ovum favoured the ascent of the uterus. This was probably a mistake as applied to cases in which the fundus becomes impacted in the hollow of the sacrum, favouring adhesion, by the pressure of opposed serous surfaces, as occurs in ovarian tumours.

Ryan, in his *Midwifery*, ascribing retroversion to distension of the bladder, advises to reduce it by two fingers in the rectum and two more in the vagina pressing upon the uterine tumour; very properly omitting the pulling down of the cervix.

Dewees presses upon the fundus with the hand in the vagina until it is above the promontory of the sacrum. The traction upon the os is omitted. The hand is then withdrawn, and a pessary is introduced. It is difficult to conceive how a pessary can be necessary when it must be as difficult for the fundus to get back past the promontory into the pelvis as to get past the same point upward into the abdomen.

Rigby places the patient upon the knees and elbows, and passes two fingers into the vagina and two into the rectum, pressing upon the fundus, and *upon the fundus alone*. He approves Dewees' recommendation to

bleed. This, however, was written before the use of ether and chloroform was known.

The position upon the knees and elbows, for the purpose of diminishing the tenesmic expulsive effort of the patient, is rendered of no importance by the employment of anesthetics, which completely obviate all expulsive efforts, permitting the employment of the more convenient position upon the back as for lithotomy.

Dr. Hodge advises interference rather than to leave the case to nature. In the earlier period, before the uterus becomes, from its size, impacted in the hollow of the sacrum, he relies upon his "lever pessary," which is fully described in his *Diseases Peculiar to Women*. In the employment of this instrument a gradual replacement is intended. At a later period he places the patient upon her back and elevates the uterus with the fingers of one hand in the vagina while with the other hand pressure is made upon the hypogastrium to aid the descent of the cervix.

According to Dr. Hodge, M. Evart employed a long bougie with a padded extremity, introduced into the rectum.

"The late Dr. Bond, of Philadelphia, contrived an ingenious elevator [figured in *Hodge's Obstetrics*, p. 416] consisting of two curved steel rods surmounted by ivory balls running parallel to each other and united near the handle. In their application, the longer rod is passed into the rectum, and the shorter into the vagina, so as to operate simultaneously upon the fundus and upon the posterior surface of the uterus."

If adhesions render replacement impossible, there is no more rational treatment than to puncture the uterus through the posterior or inferior wall from the vagina, and induce abortion; and if the fœtus cannot turn the short corner necessary to get into the vagina, an incision, at the junction of the neck and body between the duplicature of peritoneum and the os, would certainly be the only practicable expedient.

The following case is interesting on account of its history, and also for the facility with which the malposition was reduced with appliances which may be extemporized at any time:—

Mrs. Stout, aged 35, tall and thin, between four and five months in her fifth pregnancy, nothing having ever before gone amiss, became the subject of new and distressing sensations, with retention of urine, between the second and third months of pregnancy. Dr. Christy, an intelligent physician, living near the patient, found a tumour between the vagina and the rectum, and, by passing the strong middle finger into the rectum and pressing upon the tumour, he secured relief from the distressing symptom as long as the pressure was continued. Upon the theory of Meigs this relief arose from the diminished strain upon the ligamentous connections of the uterus while the pressure was applied. No particular time or circumstance could be fixed upon by the patient as the beginning of the malposition. Dr. Christy had failed to reduce the misplacement by pressure by his finger in the rectum, and he concluded to act upon the advice of Denman and wait for the uterus to rise in the progress of the development of the ovum at or before the period of quickening, in the mean time drawing off the urine regularly by the catheter.

Disappointed in this expectation of spontaneous correction, the advice of Dr. J. F. Snyder was obtained, and Rigby's plan was tried unsuccessfully. One operator introduced one finger into the rectum and the other passed three fingers into the vagina, and they both pushed, while the patient was upon her knees and elbows. They attributed their failure to want of length of fingers.

My visit to the patient was January 9th, 1865. The fundus was felt on the perineum by the finger either in the vagina or in the rectum, and no alvine evacuation had been procured for several days.

The cervix of the uterus projected above the pubis, making a hard well-defined projection, and the retention of urine had been exchanged for incontinence, probably because the cervix rising higher not only ceased to compress the urethra, but interfered with the enlargement of the bladder.

Two wooden pessaries or paddles were whittled out of pine boards for pressure upon the fundus of the uterus. One of them, for the rectum, was made one inch by three, and the other, for the vagina, two inches by three. Each was eight inches long, all parts, except the bulged end whittled down, an inch and a half in diameter. The large end of each was covered with three thicknesses of old flannel, which was thoroughly saturated with lard. Two fluidounces of urine were drawn off through a flexible catheter before the commencement of the operation.

The patient having been rendered insensible by the inhalation of pure ether, and placed in the position for lithotomy, the pessary for the rectum was introduced first, the sphincter readily relaxing to receive it, and the other was then placed in the vagina. By holding together the handles of the two pessaries, pressure was made upon the two at the same time, while they were kept from spreading apart.

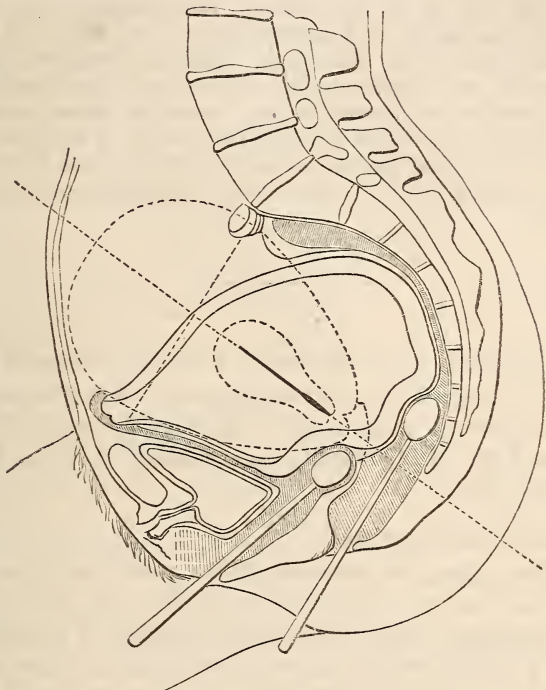
The pressure was made slowly, gradually increased, until the hands holding the pessaries felt a shock and a diminution of resistance. Upon placing a hand upon the abdomen, the fundus was felt rising near the umbilicus. Upon withdrawing the pessaries and introducing the fore and middle fingers of one hand, the neck of the uterus, with an unusually open mouth, was felt in its usual position within easy finger-reach. The peculiar tumour above the pubis had disappeared.

The replacement would doubtless have been easier at an earlier period, but the practitioner was justified in waiting by so high an authority as Denman. It is probable that no operator would now fail to avail himself of the great advantage of anæsthesia, and it is hoped that, if his fingers prove too short, he will employ a wooden pessary, which may be made on the occasion, with a good handle, or a ball, which may be of yarn or of rubber, and that he will not trouble himself about the neck, for if he can get the fundus above the promontory of the sacrum, the neck will come down by the contractility of the vagina.

The following diagrammatic illustration explains the theory of the position of the uterus—the impediment to reposition afforded by the promontory of the sacrum—the inutility of traction upon the neck of the uterus—and the *modus operandi* of the wooden pessaries or drumsticks. The diminution of the capacity of the bladder is explained by the diagram. At an earlier period, with the os uteri pressing against the pubis below the entrance of

the ureters, the pressure must cause retention and make the frequent and regular introduction of the catheter necessary.

The normal positions of the impregnated and unimpregnated uterus are shown by the curved dotted lines, and the straight dotted lines show the



plane of the superior strait of the pelvis and its axis. The general outline is taken from Hodge's *Diseases Peculiar to Women*.

After consciousness became restored, the patient took some whiskey-punch and a grain of morphia, from which she slept pretty well for several hours, and the bladder continued its functions without the further use of the catheter.

It should be mentioned that the patient had been taking grain doses of morphia for several weeks to quiet her distress. A dose of oil was given, which was vomited. Six hours later two fluidrachms of fluid extract of senna were given, which were also rejected. Pulse, six hours after the operation, of moderate fulness and strength and not much increased in frequency.

The remaining notes of the case were furnished by Dr. Snyder.

Jan. 10, 12 M. (2d day). Found the patient lying on her back with her knees drawn up, under the influence of morphia, and consequently very easy and quiet. She complained of no tenderness on pressure, except at a point just above the pubes. Pulse small, hard, and 120. Considerable thirst; no gastric disturbance; bowels not moved. At 2 P.M., voided

urine freely. Gave pulv. rhei gr. xv, and two hours later commenced the use of veratrum viride; morphia *ad libitum*.

11th, 3 P.M. (3d day). No catharsis; pulse 100; skin soft; no tenderness of the abdomen on pressure. She has taken no morphia since six A.M. Very easy; no nausea; no thirst; slight yellow coating on the tongue; urination free with but slight pain. Gave pulv. rhei gr. x, hydrarg. chlorid. mit. gr. vi, and continued the veratrum viride.

12th, 2 P.M. (4th day). A dose of oil taken in the morning had moved the bowels freely and without much pain. She has taken no morphia since yesterday morning, and is perfectly easy, with a soft skin. Pulse 80; no abdominal tenderness; in a word, we may regard the patient as recovered.

Our patient was, on the 7th of June, delivered of a daughter without any accident. From this, the patient must have conceived about the 1st of September, making her four months and a week pregnant at the time of the reduction.

ART. VI.—*Operations on the Shoulder. I. Three Successful Consecutive Cases of Resection of the Shoulder-Joint. II. Four Successful Consecutive Cases of Amputation at the Shoulder-Joint.* By HENRY F. Lyster, A.M., M.D., Detroit, Mich., formerly Surgeon of the 5th Michigan Vet. Vols.

I. *Resection of Shoulder-Joint.*

At this time, when the attention of the profession is so strongly attracted toward the surgery of the war; and when the comparative merits and demerits of amputations and resections are so generally inquired into; I take the occasion to report the histories of three successful consecutive cases of resection of the head of the humerus, which were performed by me during the active campaigns of the Army of the Potomac in 1864.

The accompanying engravings were made from Daguerreotypes,¹ taken at an average period of nine months after the operation.

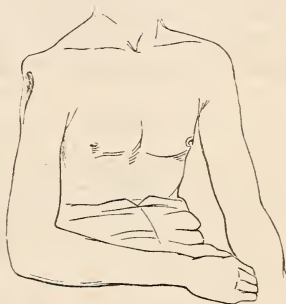
CASE I. Private R. C. H., of Co. I, 57th Penn. Vols., 3d Div. 2d Corps (residence at Sandy Lake, Mercer Co., Penn.), sustained a compound comminuted fracture of the head of the humerus (left), from a minie ball at the battle of the Wilderness, Va., May 5, 1864. The ball came from the "left flank," and struck the shoulder on its outer aspect at a right angle with its anterior face, and in nearly a horizontal direction. It passed through the deltoid, just below the acromion process, and penetrated to the centre of the head of the humerus, producing a fracture radiating in every direction. The ball, greatly to my surprise, could not be found in the bone, and must have rebounded partially and have fallen out when the clothing was removed. The fracture did not extend below the surgical neck of the humerus. The patient was put under the influence of chloroform, when I proceeded to operate, being skilfully assisted by my operating staff, surgeons

¹ [The figures, as represented in the Daguerreotypes, from which the wood-cuts were engraved, seem to have been reversed.—EDITOR.]

Jones, 63d Penn. Vols., Thompson, 124th N. Y. Vols., and Brennan, 1st N. S. S. S.

An incision four and one-half inches in length was made through the integument and subtegumentary fasciæ, from the acromion process down the outer aspect of the arm, preserving the general direction of the humerus and of the fibres of the deltoid. The coarse muscular fibres of the deltoid were next separated down to the humerus in the same direction, with the handle of the scalpel and the forefinger of the left hand, assisted here and there by the edge and point of the scalpel. The muscular attachments were separated from the tuberosities and their vicinity; the capsular ligament divided; and the head and tuberosities of the humerus removed by a chain-saw applied below the surgical neck. Care was taken to prevent hemorrhage or injury to the neighboring tissues during the operation. One suture was introduced at about the middle of the incision to promote primary adhesion of the lower portion of the wound. The patient seemed to have experienced no shock from the operation, and was able to walk from the table and to take some care of himself. He was sent to general hospital after having borne the trials and dangers of the field hospital at that place; the ambulance transportation over the worst fourteen miles of Virginia muddy road it has ever been my fortune to encounter with a train of wounded; and the crowded and unhealthy hospitals at Fredericksburg, Va. His wound, he writes me, did not heal until the beginning of September; but his general health had not suffered materially from his wound; and he was able to attend a commercial college during the whole of last winter. He wrote me in February that his "arm and hand were of great use to him;" and "at that time he could bear twenty-five pounds weight in his hand without hurting his shoulder." His "arm is steadily improving in strength and usefulness."

Fig. 1.



CASE II. Private M. D., of Co. A, 5th Michigan Vet. Vols., 3d Div. 2d A. Corps (residence at Holland, Mich.), was wounded at one of the engagements in front of Petersburg, Va., June 17, 1864, sustaining a compound comminuted fracture of the head of the right humerus. A minié ball struck the front of the shoulder and penetrated the head of the humerus, producing a radiating fracture extending down into the shaft of the humerus about one inch below the surgical neck. The soft parts were somewhat lacerated by the fragments, as the range was short; still, no important vessel or nerve was injured. The operation was proceeded with in the same manner as in the preceding case. The incision was perhaps a trifle longer and one or two small vessels were ligated. This patient was sent almost immediately to the base hospital at City Point, Va., and was after a few days sent to the General Hospital in Washington, D. C. He had a secondary hemorrhage early in July while in the

Fig. 2.



hospital, and lost a good deal of blood; fortunately this accident did not recur. His general health has been good, although the wound did not heal up entirely until April. He says under that date, "I can do my own writing, and can lift twenty-five pounds quite easily. I can raise my right hand to touch my chin and feed myself, and leave no pain in my shoulder. I would not have it off for anything in the world."

CASE III. Corporal W. H., Co. K, 120th N. Y. Vols. (residence in De Lancy St., N. Y. city), sustained a compound comminuted fracture of the head of the right humerus from a minié ball received in action in front of Petersburg, Va., July 30, 1864, the day of the explosion of the mine under the rebel fort. The ball struck from the front—though I do not remember that it was found in the wound. The head, and tuberosities, and surgical neck of the humerus were badly fractured, and a slight hemorrhage from one of the circumflex arteries oozed out of the mouth of the wound.

The examination under chloroform having determined the condition of affairs, I proceeded as in the former cases, with the additional assistance of Surgeon Van Steinberg, 120th N. Y. Vols.

The incision was made more towards the front than in the two cases previously mentioned, and was about five inches long, and slightly convex anteriorly, so as to involve the wound of entrance, in the incision. Great

care was observed, owing to the bone being approached from a position nearer the axillary vessels and nerves.

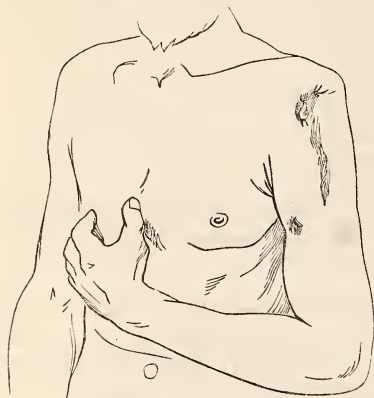
The cicatrix which appears in the engraving on the arm, and on a line with the right nipple, was formed by an abscess having pointed and been opened at that place during the healing process.

Owing to the necrosis of a small ring of the upper end of the shaft of the humerus, which was removed in April, the wound had not entirely healed. In May, when I last heard from him, it was almost entirely healed, and the impression was that it would be quite well in a couple of weeks.

His general appearance would indicate that his constitution had not felt the drain upon it to any appreciable extent. In regard to the use he has of his arm and hand, at this comparatively early period, he wrote to me in May as follows: "I think it is worth more than all the artificial limbs ever made. I can write quite easily on a low table, with the paper a little closer to the body than is common. I can cut my meat with it, and, if I exert myself, can raise my food to my mouth with that hand. I can lift a child two years old quite easily, one four years old with difficulty. When walking, I can, with a little exertion, give my arm the proper swing and stiffness. I can straighten it quite easily; and the sensation is as good in one hand as in the other. The arm is gradually improving, and I hope will be very useful."

These three cases were operated upon within a few hours after the injury had been sustained, and were all of a class where the necessity of active

Fig. 3.



surgical interference is universally admitted. The only questions that arose were, Shall we amputate at the shoulder? or shall we resect the head and neck of the humerus? These questions cannot always be easily decided, and I have no doubt that arms have been sacrificed which could have been saved, and would have been, had the surgeons considered the operation for resecting as affording an equal chance for the patient's recovery. So far as my experience teaches me, though I have rarely seen the operation performed in the hospitals or in the field, the results of the only cases in which I have ever performed the operation have all been so favourable that they would seem to warrant the resection whenever the nature of the injury will allow, especially in recent gunshot wounds. In many instances the extent of fracture down the shaft of the humerus, the laceration of the muscular tissue, or the injury of the axillary vessels or axillary plexus of nerves, or, judging from the track of the ball, the anticipated sloughing of the brachial artery, will necessitate amputation at the shoulder without delay or hesitation. This is also very generally the case in shell wounds, owing to the extensive laceration or to the internal destruction of all the tissues of that region, even when the skin remains almost entire. A case of this latter nature I remember meeting in one of the battles in front of Petersburg, Va., which abundantly justified an amputation at the shoulder, when the only apparent wounds were made by two sharp spiculæ from the humerus protruding through the skin on the outer aspect of the arm, below the shoulder, making incisions not more than three or four lines in length.

The simple manner in which the operation for resection of the shoulder may be performed by the single straight incision, with the slight amount of injury to the soft tissues—rarely more than two small vessels, if any at all, requiring the ligature—and yet the grand results which are obtained for the patient in the preservation of his arm and hand, should, in my opinion, be made to weigh in the balance, when the chances for and against are at all evenly divided. In the cases already detailed it will be seen that the arms are all of much use, and in none of them is there any pain. If these men can use them so much as they say they do at the end of the first eight or ten months after the operation, of how much more value will they be to them when nature has firmly knit the wounds and healed and strengthened the injured parts, and habit and custom and exercise have taught them the manner in which they can be used to their greatest advantage!

II. *Amputations at the Shoulder-Joint.*

CASE I. Private T. C., of Co. B, 5th Michigan Vet. Vol. Infantry, 3d Division, 2d Corps (residence at Utica, Mich.), was wounded in the right shoulder, while in action at the Wilderness, Va., May 5, 1864. He was struck towards the close of the day, by a minie ball, fired at remarkably short range, probably not more than three or four rods, as the ground contested was in the immediate vicinity of the memorable Wilderness Plank

Road. He was placed under the influence of chloroform the next morning, at the Division Hospital, and it was then discovered that the ball had shattered the head of the humerus quite extensively, and had also fractured very severely the upper one-third of the shaft. The ball had struck the humerus just below the tuberosities, in a horizontal line midway between the anterior and outward aspect of the arm, and, passing completely through, had escaped in the vicinity of the posterior border of the axilla. The question of resection could not be entertained, on account of the extent of the fracture down the shaft of the humerus, as well as owing to the extensive laceration of the muscles which existed, having been made by the ball and by the splinters of bone. The subclavian artery having been compressed over the first rib, and the patient having been turned upon his left side, the amputation was performed after the simple method of Larrey, which is so well known that a description here is unnecessary.

I prefer this operation to any of the others, for gunshot wounds, for several reasons; and one of the chief among them is this, that the first incision, extending perpendicularly from the acromion process, may be prolonged to the extent of three and one-half or four inches, and the diagnosis fully and satisfactorily determined, and the question as regards resection or amputation definitely settled from a view of, or at least a free entrance to, the comminuted parts. In case resection is determined upon, it can readily be performed through this single incision; but if the destruction of the parts is so serious or extensive as to demand amputation, the operator will simply begin his oblique incisions an inch below the acromion. The wound of entrance is usually on the outer aspect of the arm, and is generally either below the angle made by the oblique incisions, or it may be involved in the first or perpendicular incision, unless it be too near the anterior aspect of the arm. The lateral or oblique incisions should be somewhat convex from the shoulders, to afford sufficient material, so that when the operation has been completed, and the sutures are introduced, there will not be too much tension across the middle of the wound. Care should also be observed that the soft parts and integument severed by the last cut of the knife are not divided too far out upon the arm, as in such case there would be a projection downward of a portion of integument. The cicatrix from this operation will be a perpendicular line extending from the acromion down four or five inches, varying with the size of the individual.

This patient was captured by the enemy, together with the hospital, and was held for a couple of weeks, subject to all the exposure and neglect that are usual under such circumstances. He was afterwards sent to General Hospital. When next heard from by me, he was an inmate of the Harper General Hospital, at Detroit, Michigan, where he had an abscess in the vicinity of the wound, by which he was much prostrated. With the aid of good medical attention and nursing, he was eventually enabled to make an excellent recovery. He has been discharged the service, and since early in the winter has supported himself and family by his own labour.

CASE II. Private E. F., of the 12th New York Independent Battery, 3d Division, 2d Corps, was wounded in the right shoulder by a minié-ball, while in action at Tolapotomy Creek, Va., May 31, 1864. Upon placing him upon the table, and under the influence of chloroform, and examining the extent of the injury, I found that the head of the humerus and the upper third of the shaft were badly fractured, and in places were comminuted. The soft parts in the vicinity of the fracture were very thoroughly broken down, and a constant, though not very serious, hemorrhage trickled from the wound. A perpendicular incision was projected from the acromion, four inches down the outer aspect of the arm. The extent and condition of the wound were of such a nature as to compel amputation. The operation was performed as in the previous case. The patient was almost immediately transferred to the ambulances, and sent to White House Landing. One year from the day of this operation I received a letter from the captain of his battery, stating that he had recovered, and was then detailed in U. S. General Hospital at Rochester, N. Y.

CASE III. Private A. M. N., of Co. C, 1st Mass. Heavy Artillery, 3d Division, 2d Corps, was wounded by a piece of shell in the left shoulder, while in action near Petersburg, Va., June 22, 1864. Upon examination, under chloroform, the head of the humerus was found badly comminuted, and the neck and two inches of the shaft of the bone extensively fractured. The piece of shell was not in the wound, and had indeed produced all this internal destruction without lacerating the skin, except in two places, and in those only for a few lines. The skin, however, was the only structure that was uninjured; the muscular tissues were found to have been broken down as far as the injury to the bone extended, and so completely were they destroyed that there were not enough to allow of a resection being performed. Larrey's operation was here again performed, and the patient made a rapid and excellent recovery. He resided, when I last heard from him, at his home, in Lynn, Mass.

CASE IV. Sergeant H. S., of Co. E, 40th N. Y. Vet. Vols., 3d Division, 2d Corps, was wounded by a minié-ball in the right shoulder, while on picket in front of Fort Davis, near Petersburg, Va., Sept. 10, 1864. He was immediately transferred to the Division Hospital, and examined under chloroform. The upper third of the humerus was badly shattered, and radiating fractures extended into the head of the humerus. There was extensive laceration of the soft tissues, extending into the axilla. The ball passed out through the pectoralis major muscle, near the right nipple. There was a moderate amount of hemorrhage issuing from the wound. The destruction of both hard and soft tissues having been found so extensive, amputation was at once performed, after the method adopted in the three cases previously mentioned. The patient was retained until nearly well in the Division Hospital, and made a rapid recovery, not remaining in hospital longer than two months. He is now in his usual health, which is good, and is able to maintain himself. He was residing, when I heard from him last, at Delhi, N. Y.

These cases have been reported chiefly with the view of drawing attention to the great success we may expect from primary operations at the shoulder-joint; and this is the case even where we have to contend against the thousand evils of transportation, and the many varieties of exposure

and neglect which those wounded in the field have necessarily to undergo. Too many men suffering under this class of wounds have been allowed to go to the rear after our great battles, and have turned up among the fatal cases in the statistics of secondary operations made at the general hospitals.

ART. VII.—*Epidemic Typhus, or Spotted Fever.* By WM. H. BALTZELL, M. D., Frederick City, Md.

IN view of the attention that has, within the past few years, been attracted to an apparently novel disease, not only whose nature, but whose proper nomenclature even, remains still undetermined, I have been induced to add to the common stock some cases occurring in my own practice. This disease, pursuing the capricious course notable in other epidemics, has appeared in various localities throughout the country, only to excite alarm by its unusual malignancy and fatality, and to baffle the skill of our ablest physicians.

The difficulties attending the subject are considerable; and are indeed to be expected, when, from the vagaries of that mysterious force, which we denominate “epidemic influence,” or in consequence of what Sydenham termed the prevailing “medical constitution,” any disease has particular prominence given to some symptom or group of symptoms, thus obscuring or modifying its true character.

It has occurred to me that a solution of these difficulties might be at least approximated by regarding the subject from this point of view; and, that before acknowledging its novelty, it would be advisable to endeavour to reconcile its anomalies, with the peculiar operation of the essential causes of a known malady.

CASE I. On the 31st of March, 1864, I was called upon to visit Minty, *slave* of W. F. Berry, Esq., of Prince George. I found her propped up in a chair, complaining very much of muscular weakness, and of violent pains in the occipital and spinal regions; there was hyperæsthesia of the skin; any light or sudden touch caused her to shrink. The surface was hot and dry, communicating to the hand that sensation of pungency described in the books, under the name of “calor mordicans.” Her countenance expressed considerable anxiety, and her respiration, although somewhat hurried, could not be called oppressed; there was neither cough nor pain in the chest. The bowels had been rather inactive for several days, but there was no marked constipation nor any tympanites; on the contrary, her abdomen seemed somewhat sunken; her appetite had completely failed her, though her stomach readily retained whatever nourishment or medicine she was directed to take. The pulse was about 110, full, soft, and compressible; the tongue was dryish, but not parched, and was completely covered with a thick yellowish-white fur, and retained the impression of

the teeth. The urine had been passed in the early morning, and had presented nothing unusual as to its appearance and quantity. She had been taken with a chill the previous night, which had continued several hours, and had not been succeeded by the customary febrile and sweating stages, but had left her in the condition in which I found her. She was ordered to take calomel gr. x and jalap gr. xx, and to have administered to her spirit of nitric ether and acetate of ammonia every two hours; sinapisms to be applied to the temples and nape, and stupes of turpentine along the spine; her diet to consist of rice-water and light chicken-soup—a small dose of Dover's powder to be taken at bedtime.

April 1st. Patient apparently worse in every particular; there was complete anorexia, and her pulse had increased in frequency, and was gaseous. The skin possessed the same pungent heat, and the tenderness of the surface was augmented; the purgative had produced but a trifling motion from the bowels, though the kidneys had acted freely, and her tongue was somewhat moist. The pain in the head and back had diminished, but she was very dull and drowsy, though easily aroused from this condition by any noise—when her countenance expressed a very curious intermixture of apathy and anxiety: she would relapse into sleep sometimes in the midst of a sentence. The cathartic having failed to have the desired effect, an enema of castor oil and turpentine was ordered. She was directed to take quinia gr. ij every two hours, and tinct. ferri chlorid. gtt. xx et potass. chlorat. gr. x twice in the course of the day: the Dover's powder to be again administered at bedtime. The application of the flannels, wrung in warm turpentine, to be continued, and the same articles of food to be given her regularly and at short intervals.

2d. Had passed a bad night, having been restless and wakeful, and also slightly delirious at times; the pain in the head and back seemed considerably relieved, though the head itself was preternaturally hot, and the eyes were slightly injected; the tenderness of the surface had abated. She complained of some stiffness of the neck, and the hands were slightly tremulous; the tongue had become somewhat moist, but evinced no disposition to clean itself: little effort seemed required to protrude it. The pulse was weak, quick, and frequent; there had been no moisture on the skin; and at the time of my visit she was very nervous and uncomfortable. The enema had produced two copious, dark-coloured, and offensive stools; and there had been but a small quantity of urine discharged. She was directed to continue the quinia, chlorate of potassa and iron: the latter to be taken three times in the twenty-four hours; the Dover's powder to be repeated at night. Weak whiskey-toddy was to be furnished her at intervals, and her nutriment was to consist of beef or mutton soup and milk.

3d. Pulse still very weak and rapid; tongue dry, and fur on it somewhat of an ashen hue; sordes were commencing to collect upon the gums; abdomen flat; and no movement from the bowels since my last visit; what little urine had been passed was dark-coloured and offensive.

There was slight subsultus and considerable stupor, from which, however, she was easily aroused, when she gave correct replies to questions; there had been some moderate convulsive movements, during the early part of the night, which had been followed by the state of stupor in which I found her; the stiffness of the muscles of the neck had increased, and the head was slightly retracted. I directed calomel gr. $\frac{1}{2}$, and quinia gr. iij, to be administered every two hours, the chlorate of potassa and iron to be continued as before; an enema to be given, and a blister to be applied to

the nape; beef-tea and milk-punch; whiskey, beat up with white of eggs; sugar and nutmeg to be freely allowed.

4th. Very much worse; pulse thready and irregular; tongue brown and parched, and the gums covered with dark sordes; comatose, from which state she was with great difficulty aroused, when she moaned, and gave incoherent replies; continued subsultus; head retracted; deglutition performed with great difficulty. She had had one small black and horribly fetid discharge; and the bladder had been emptied once of a small quantity of offensive and ammoniacal urine. She was ordered to have carbonate of ammonia given to her every three hours, the quinia to be continued, and beef-tea and whiskey *ad libitum*. I replaced the blister on the nape of the neck—which had not drawn—with a fresh one; also sinapisms were applied to the wrists and ankles.

5th. Patient moribund, pulse absent from the wrists, head strongly retracted, and the muscles of the neck, chest, and back rigid; coma complete; countenance Hippocratic, and the surface bathed in a clammy sweat. Death occurred on the same evening. After death, I observed, for the first time, some ecchymotic spots on the sides of the neck; decomposition took place very speedily.

CASE II. Jim, the husband of Case I., had been most constant and assiduous in his attention to his wife during her illness; he had been complaining for several days of uneasy and uncomfortable feelings, and was at length compelled to take his bed on the 16th of April. His fever was of the same low, adynamic type, accompanied by heaviness, stupor, and rigidity of the muscles of the neck. Muttering delirium was present at the height of the attack, but no convulsions supervened. I could discover some petechiæ on the fourth day, upon the neck and upper portion of the chest. Under the same treatment to which his wife had been subjected, convalescence was established in about three weeks; but his restoration to complete health was very tedious and uncertain.

CASE III. Dennis, a cart-driver, was taken sick on the 21st of April; he made light of his indisposition, and insisted upon continuing his employment, contrary to the wishes of his master and myself, until the 24th, when he fell down in the field with what seemed an attack of vertigo. From this date his muscular power left him, and on the following day, being the fifth of his disease, I observed some few petechiæ upon the front part of his neck. The next day rigidity of the muscles of the neck and retraction of the head took place, followed by coma, and death, which occurred on the 28th of the month. His body gave evidence of putrefactive change very early after his death.

CASE IV. Ben, a gardener on the same plantation, fell, whilst engaged in his occupation, without ever having complained of any premonitory indisposition whatever. His pulse was almost imperceptible from the first, and the indications of nervous prostration were extreme; coldness of the surface, and muttering delirium. I was unable to establish reaction, although carbonate of ammonia, quinia, and stimulants were freely resorted to, and faithfully persisted in until his death, which was preceded by coma, and occurred on the third day of his illness.

CASE V. This case was that of Dick, a field-hand, of a rheumatic diathesis, and was complicated with violent pains in the ankles and knees.

There could be no mistake, however, as to the character of the disease, from the rigid condition of the muscles of the neck and the peculiar nervous phenomena accompanying it. The only variation made in the treatment consisted in the administration of colchicum, and the application of a succession of small blisters to the affected joints. He recovered after a tedious convalescence of about two months.

CASE VI. John Sweeney, a white man, the manager of an adjoining plantation, was first attacked with pleuritis; when the inflammation seemed to have been entirely subdued, he was suddenly seized with general convulsions; petechiæ made their appearance on the fourth day from that date. His case assumed a character very similar to those already reported, and, under similar treatment, he recovered, though it was five months before his strength was restored.

In relation to these cases, I would remark that all the negroes occupied the same cabin or quarter, and that it was located in a healthy, elevated, and well-drained spot. These tenements are usually constructed double, for the accommodation of two families, with two rooms and a loft on each side; the floors are generally composed of hardened clay; and whilst the cabins are warm and comfortable, their ventilation is defective. The domestic economy of their inmates is *not* a practical recognition of the truth that "cleanliness is akin to godliness." There was a filthy pig-sty on one side of the quarter, leaning against it, and a foul poultry-house on the other. The food furnished, though coarse, was always nutritious and abundant; and during their sickness every delicacy ordered was liberally supplied. I observed petechiæ in all the cases but two, and in them the colour of the skin was exceedingly dark. The bodies of all those who died speedily exhibited evidences of decomposition; but I was unable to procure any *post-mortem* examinations.

Concerning the nature of the disease under consideration, it is a circumstance worthy of remark that whenever a malady assumes any unusual form, or presents any anomalous symptoms, there is always too ready a disposition to accept the novelty of it. It is always an easier task to describe a disease than to analyze its symptoms; and the ready acceptance of a new medical theory involves less trouble, if not quite so much satisfaction, as the proof of it.

Whilst a very strong analogy is admitted by writers to exist between our vexed disease and typhus, it is remarkable that such a small degree of importance seems to be attached to this fact. Inquiry appears to have been based so completely upon the assumption of their distinctive nature, as to have precluded the exercise of any earnest effort to reconcile their various points of difference to the possible operation of influences ordinarily changing the type or masking the quality of disease. That rule of inductive inquiry which requires that no phenomena should be attributed to unknown causes that can be explained by the operation of those that are already known, does not appear to have been kept in view; and yet I

believe that a more careful analysis, and a closer application of this rule of Newton's Principia to the investigation of the nature of the complaint under consideration, must lead to the conclusion that those analogies between the two affections, that have been so freely admitted and yet so lightly considered, are indeed the "footprints of identity," and that in the spinal meningitis and spotted fever of the present day we have simply an anomalous form of typhus fever. I feel somewhat strengthened in this view from the fact that it in a measure coincides with that expressed by authors whose opinions are entitled to weight in the profession, relative to similar epidemics occurring in New England and France in the early part of the present century. "M. Boudin has identified this disease, as it appeared in France, with typhus fever, from the ordinary forms of which it differs simply in the seat of the local lesion. . . . Another strong argument in favour of this view of its nature is the powerlessness of purely antiphlogistic measures in its cure, whilst it yields not unfrequently to an opposite treatment. . . . The disease as it has occurred epidemically in the United States is probably of the same character. . . . I have little doubt that whenever it occurs as an apparent epidemic, presenting the grave characters above described, it is in fact a form of malignant fever belonging to the group of typhous diseases." (*Wood*, vol. ii. p. 766.) Dr. Nathan Strong regarded the disease as one of the forms of typhus. Dr. Gerhard says that it was similar in its nature to the British typhus. Dr. Bartlett, whilst differing in opinion, admits that "in many important particulars it bore a very striking resemblance to true typhus." Indeed, if we properly weigh and consider, in all their relations, these "many important particulars" of "striking resemblance," their reference to the operation of separate and distinct causes involves greater violence to the understanding than does the assumption that the points of difference are merely varieties in the mode of action of the same cause. I contend that their analogies are too forcible to justify us in the attempt to separate the two diseases without first submitting their dissimilarities to the test of a more rigid analysis. We must first endeavour to reconcile their differences, which are really mainly differences in degree, before we are authorized to seek a new name for this disease.

Let any inquirer carefully examine into these "striking resemblances," not indeed as he mayhap will discover them within the limited round of his personal experience, but as they force themselves upon his attention from the study of a large number of cases, and their significance cannot consistently receive that summary dismissal observed in most papers that have been written upon the subject. Both are adynamic febrile diseases, assuming at an early period a low nervous form; both are associated with a peculiar petechial accompaniment, *and this, too, in a proportion of cases much more nearly equal than is generally supposed.* Both diseases are prominently and uniformly marked by great functional disorder of the

cerebro-spinal axis; indeed, the febrile poison seems to have a special affinity for the organs controlling animal life, frequently destroying the patient by their overthrow, before any serious lesions are produced in those of organic life, save such as are effected by virtue of the connection of the two. The correspondence in the localities and circumstances mutually chosen by them both, under which to display their fatal power—the selection of ships, hospitals, contraband camps, and the crowded and ill-ventilated cabin of the slave, well known as the favourite fields in which typhus reaps its harvest of death—argues something more than mere coincidence and “striking resemblances.” Again, the similarity in the treatment regarded as appropriate to them both, by intelligent physicians, establishes a closer relationship between them than this fact alone should have been capable of suggesting. But a most important and forcible argument in favour of their identity is deducible from the very close correspondence of the anatomical lesions of the two affections. There is the same dark-coloured, fluid, and dissolved condition of the blood, and that passively congested appearance of the various internal organs incidental to that state of it. In both, the lower and posterior portions of the lungs exhibit evidences of a feeble attempt at inflammatory action. In both, there are effusions and congestions within the cranium, and frequently signs of previous inflammation. *Post-mortem* examination in typhus fever, equally well with those performed after death from this disease, justifies the following: “The conclusion is irresistible that the disease itself consists of a pathological condition of the system at large whereof the various local lesions enumerated above are but the accidental manifestations.” (*Lidell.*) It does not, however, enter into the projected plan of the present article to discuss the bearing and importance of the many particulars in which the two affections resemble each other, but rather to examine a little more closely into the weight of those points of dissimilarity that have been accepted as the basis of a differential diagnosis between them, and which present themselves with such force to some minds as to lead to the opinion that “they differ from each other as widely as typhoid fever differs from measles.” (*Lidell.*)

I think that the principal differences which have obscured the identity of our present epidemic with typhus may, upon a careful examination, be all included within the following two classes: I. Irregularities in the date and frequency of the appearance of the petechial spots. II. Irregularities occasioned by the peculiar character and violence of the head-symptoms.

I. First, as to the supposed great irregularities that exist in this disease, as compared with typhus, in connection with the petechial spots. It is asserted, by those who advocate the distinctive character of the two affections, that the variation between them, both in the date of the appearance of the petechiæ and their comparative infrequency in the present epidemic, is sufficient to warrant the opinion that the diseases are dissimilar. I propose to examine somewhat more particularly into these asserted differences,

and will do so under both relations. And first, as to their relative infrequency in "spinal meningitis." So much stress has been placed upon this fancied deviation, as to have led me to bring to bear upon it the application of statistical inquiry; and, as is commonly the case, the result does not accord with the preconceived impression. For the sake of convenience, I have thrown the cases into a tabular form.

Name of Reporter.	No. of Cases.	Cases of Petechiæ.	Date of their Appearance.
Wales . . .	7	7	4 on the first day; 2 on the second; 1 on
Jenks . . .	1	1	1 on the second. [the eighth.
Jewell . . .	1	1	1 on the first.
Stillé . . .	1	1	1 on the first.
Levick . . .	4	4	3 on the first; 1 on the third.
Gilbert . . .	3	3	1 on the second.
Edes . . .	1	1	1 on the second.
Lidell . . .	3	1	Observed after death.
Burns . . .	12	3	2 on the first; 1 on the second; ecchymo-
Black . . .	7	4	1 on the fourth. [ses, vibices, &c.
Baltzell . . .	6	4	2 on fourth; 1 on fifth; 1 after death.
	<hr/> 46	<hr/> 27	

I would state that all these cases were procured from reports in the *American Journal of the Medical Sciences*, from Jan. 1864, to April, 1865, inclusive. They were not selected cases, but comprise *all* reported in that Journal within that period, in which the date or absence of the spots is noted; for it must be here remarked that some writers, who attach the greatest diagnostic importance to this symptom, are least regardful of precision in reporting upon it.

We thus find, that in 46 cases, or (putting aside those of two negroes whose skin was very dark) in 44, the petechial spots were observed in 27, or in 61.3 per cent. Let us compare this result with some observations made upon their frequency in typhus. Rayer (p. 323) asserts "that of 194 attacked with typhus at Volterra, in 1817, 156 exhibited petechiæ," or, putting it in another form, 80 per cent. In Dr. Gerhard's cases, in Philadelphia in 1846, they were present in 32 out of 36 cases, or 88 per cent. Dr. Stoker states "that of 540 patients received into the Cork Street Hospital, 386 had petechiæ," or 71.4 per cent. (*Cyclopedia Practical Medicine*, vol. ii. p. 164, Am. Ed.) Throwing these results into the form of a table we have:—

	Cases.	Petechiæ.	Per cent.
Typhus (Rayer) . . .	194	156	80
" (Gerhard) . . .	36	32	88
" (Stoker) . . .	540	386	71.4
Spinal Meningitis . . .	44	27	61.3

It certainly does not appear to me that these differences are sufficiently great to justify us in attaching to them the diagnostic importance that they have received, especially when we recollect that in undisputed typhus these spots are "only frequent, not inseparable attendants" (Pringle); and that

"this petechial eruption is not constantly observed in typhus fever, but seems to form an occasional characteristic of some epidemics" (Tweedie). The truth is that prudence should lead us to refrain from attaching undue importance to any irregularities connected with petechiæ, when we recollect that attention was first particularly called to them at so recent a date as 1832; and that upon this subject "it is to be remembered that the diagnosis of typhus fever, by many who have written most extensively and most magisterially upon the subject, has been anything but rigorous and careful." (Bartlett, p. 208.) Even the slight difference, evidenced by the comparison I have instituted, would, in all probability, diminish upon the examination of a larger number of cases, for the popular name of "spotted fever" would seem to indicate a closer relation between this symptom and the prevailing disease, than the loosely recorded observations of some writers would suggest. Thus, Dr. Jenks (*Am. Journal Medical Sciences*, Jan. 1864, p. 283) says that the spots were present in a majority of cases, but as he only gives the date of their appearance in one case I was only able to embrace that one in the table.

Further analogy between the two diseases is deducible from the presence of ecchymoses, vibices, efflorescences, &c., observed by Drs. Burns and Black in those of their cases not marked by petechiæ, these constituting instances of "other eruptions, but none of them at all constant or characteristic, occasionally observed in this disease (typhus)." (Bartlett, p. 212.)

2d. As to the relatively earlier date of the petechial spots in the so-called "spinal meningitis," a reference to the table will show that the difference in this respect, between the two affections, is also not so great as is generally assumed. Thus, in 25 cases, in which the date of their appearance is given, excluding those only remarked after death, I find that they occurred on the 1st day in 11, on the 2d in 8, on the 3d in 1, on the 4th in 3, on the 5th in 1, and on the 8th in 1, the *average* date of their exhibition being on the 3d day. Let us now see what has been noted in typhus. Rayner and Stewart tell us that these spots appear from the 2d to the 13th day; Dr. Wood, that they are present from the 3d to the 13th; in Dr. Gerhard's cases they occurred from the 5th to the 8th; in the present disease from the 1st to the 8th. It is thus seen that between individual cases of typhus there is a greater variation in the date of their appearance than exists between their manifestation in that recognized disease and in the present epidemic, and there seems no reason why any arguments in favor of their distinctive character, that are based upon this variation, should not be equally as conclusive between two cases of typhus, for example, between a case in which the petechiæ are observed on the 2d day and one in which they are observed on the 13th day.

The fact seems to be that petechiæ have no regular date of appearance, but that they are incidental to certain physical changes of a toxæmic character wrought in the blood, and that the period of these changes is de-

pendent either upon the varying intensity of the poison or the relative susceptibility of the system to its influence. It cannot be denied, however, that there is a difference, and that the spots appear earlier in the present epidemic than in ordinary typhus, and it behooves us, if possible, to reconcile this difference with the identity of the two complaints. I think that undue importance has been attached to this variation in date, from our very generally confounding these spots with eruptions in the sense usually conveyed by the latter term, whereas the conditions precedent for their respective presence are almost directly opposite. Thus, an eruptive disease is usually associated in our minds with the idea of some inflammatory action in certain portions of the skin, which action itself involves either an increase or perversion of *vital* activity; whereas what are called petechial "eruptions" are dependent upon circumstances which, destroying the vital relation of the blood to its containing membranes, permit the operation of those *physical* forces that favour its escape from the capillary vessels.

Let these conditions exist, let these requisite changes be effected, the blood escapes from the vessels, and infiltrates the skin at a period synchronous with them, and this may occur in a few hours, as we see in poisoning from carbonic oxide (Christison), or, as we have seen in typhus, this period varying from the 2d to the 13th day. That the conditions favourable for the appearance of petechial "eruptions" are really incompatible with that state of the system suitable for a true eruptive process to occur, is seen in the fact that when they manifest themselves during the course of an exanthematous disease, they do so with the invariable effect of arresting or aborting the inflammatory action in the skin. Doubtless, much uncertainty and discussion have originated from the want of a practical recognition of these facts, and from our habit of esteeming typhus an exanthematous disease, in the same sense in which we regard variola and scarlatina to be such, when, in fact, the cutaneous changes in typhus are not accompanied by those "deranged sensations or evidences of vascular irritation or of inflammation" (Wood), which distinguish the eruptions peculiar to the latter diseases. The idea desired to be conveyed is this, that what are called the "eruptions" of typhus are due to certain physical changes wrought in the blood by the action of some toxæmic poison. They, being really exponents of these changes, may occur sooner or later, according as either the degree of intensity of the poison, or a diminished power of resistance in the system to its influence, may effect these changes. The correctness of this view seems to derive confirmation from the fact that the gravity of the attack and the mortality in both diseases correspond with the relative date in the exhibition of the petechiæ, as if they were indices of the degree in which the blood is corrupted. Thus I find that of the 11 cases in which the spots appeared on the first day there were 9 deaths, and in all the systematic works on typhus we find an early appearance of petechiæ included amongst the unfavourable symptoms as adding gravity to the prognosis. In this

connection it may be well to call to mind this practical truth: "Observations have been made, and the suspicion expressed, from time to time, that some of these (febrific poisons) cause death before their specific characteristics are developed, exciting rapidly fatal inflammation in the *brain*, heart, and lungs, and other organs." (*Medico-Chirurgical Review*, Jan. 1849, p. 80.) Inasmuch as so great discussion has arisen, in connection with these petechial spots, a short *resumé* of their probable pathology will not be foreign to a more satisfactory elucidation of our subject. Under the caption of "Peculiar States of the Skin not referable to Inflammation" Rayer defines petechiæ to be "minute red or violet-coloured spots, formed by small quantities of blood deposited within the substance of the skin." The conditions requisite for its escape consist of certain changes of a degenerative character occurring in the blood, and a stasis of that fluid in the capillaries. These changes in the blood consist in a diminution of its specific gravity and its greater fluidity; both the corpuscles and fibrin, as well as its albumen and salts, are reduced to a proportion below even the minimum in healthy blood. The globules are broken down and softened, and readily part with their colouring matter. As might be supposed, its power to convey oxygen is impaired or destroyed, as the experimental researches of Hoppe and Virchow have actually demonstrated. (Virchow, *Cell. Path.*, p. 262.) "In malignant typhus the blood is very fluid, coagulates imperfectly or not at all, and the serum is of various shades, from a bright yellow to a red tint. The hæmato-globulin is dissolved in the liquor-sanguinis, and then red or yellow transudation takes place." (*Brit. and For. Med.-Chir. Rev.*, Jan. 1849, p. 96.) But in consequence of these changes in the blood, the power of all those forces that contribute to its motion through the capillaries is impaired. The heart, not receiving its accustomed stimulus of healthy oxygenated blood, has its propulsive energies weakened. The *nervi vasorum* become paralyzed from the influence upon their centres of the carbonated and corrupted fluid. The functions of nutrition, secretion, &c., upon which its motion in part depends (Carpenter), cease to be performed, and that chemical affinity between the membranous walls and the contained fluid, which influences capillary motion, the active agent of which affinity is oxygen (Draper), is destroyed. Hence a stasis necessarily occurs. We thus have the dissolved fluid and semi-putrid blood stagnated within the weakened and distended walls of its capillaries, these being conditions favourable for the display of the physical forces of imbibition and infiltration, shown by Matteucci to be the active agents in the phenomena of effusion and exudation. The hue of the petechial spots may vary from a yellowish to a dark-red or purplish colour, according to the degree in which the hæmato-globulin is dissolved in the transuded liquor-sanguinis, or the blood itself may escape from the ruptured walls of the capillaries. It will be recollected that these ecchymotic phenomena are not confined to the skin in this disease, but are observed in various internal tissues, thus

agreeing in another important respect with typhus. "These spots or exudations of blood are not confined to the skin, but spread over the serous and mucous membranes, hence, in fatal cases of petechial fever, the surface of the viscera has been found studded with small, bloody effusions." (*Cyc. Pract. Med.*, vol. ii. p. 164.) If this view be correct, if the spots be really due to the action of physical causes, the operation of which may take place indifferently in typhus from the 2d to the 13th day, and in this epidemic from the 1st to the 8th day, and if these variations be completely explicable, by the fact of a varying intensity of the toxæmia, as evidenced by the relative mortality associated with their period, surely there is no basis here upon which to erect a differential diagnosis.

II. Irregularities, occasioned by the peculiar character and violence of the head symptoms: Perhaps more discussion has arisen from a conflict of opinion concerning these symptoms and their asserted great dissimilarity in the two diseases, than from any supposed variation in the cutaneous accompaniment; and yet, I think that it can be shown that those, and they are numerous, who, regarding it as a novel disease, have proposed for it the name of "Cerebro-spinal Meningitis," have lost sight of the essence of the disease in consequence of the prominence of a complication. Their opinion is based mainly upon, 1st, the asserted wide difference between the anatomical cerebral lesions that appear in typhus and those characteristic of this disease; and 2d, the frequency of coma and convulsions in this, and their assumed rarity in typhus. I will first consider the pathological changes within the cranium, and admitting that differences, to some extent, do exist, I will compare them a little closely, so as to see if they be so decided as to warrant us in separating the two diseases.

Lesions of Cerebro-spinal Axis.

SPINAL MENINGITIS.

Case I. "A large quantity of serum flowed out in removing the calvarium. A moderate quantity of serum beneath the visceral arachnoid membrane which had lost its transparency. * * * Moderate quantity of limpid serum in the ventricles. * * * Choroid plexus thickened, cerebrum, cerebellum, pons Varolii, and medulla oblongata moderately congested. Much serum in the spinal canal, its arachnoid membrane opacified; vessels intensely congested; structure of the cord not presenting any abnormality." (*Lidell, Am. Journ.*, Jan. 1865, p. 19.)

Case II. "Upon removing the calvarium about four ounces of blood and serum flowed out. The veins and sinuses of the brain were congested with fluid blood; there was a moderate amount of sub-arachnoid effusion over the hemispheres, and the ventricles contained about an ounce of serum. The spinal

TYPHUS FEVER.

"In all the cases reported by Dr. Gerhard there was unusual engorgement of the sinuses and larger vessels of the brain. These were filled with dark-coloured, fluid blood. * * * Varying quantities of serum, from one to two drachms to one or two ounces were found in a certain proportion of cases under the arachnoid, or within the ventricles. In every case, but one, the bloodvessels of the brain are said to have been well filled; their congested condition was indicated by the number of bloody spots which appeared upon the cut surfaces." (*Bartlett*, pp. 218, 219.)

"In the majority of cases the arachnoid membrane exhibits traces of previous inflammatory action; it is sometimes simply vascular, in other cases thickened and opaque, with more or less effusion between it and the pia mater. In the ventricles there is generally a small quantity

cord and its membranes appeared healthy, and there was no congestion of them." (Lidell, *Am. Journ.*, Jan. 1865, p. 22.)

Case III. "The vessels of the dura mater were markedly congested with fluid blood very dark in colour. A yellow effusion existed in the sub-arachnoid space; it proved to be of a serous character and to exist in the spinal canal also. The substance of the brain was with very little, if any, congestion. In the lateral ventricles there was a somewhat abundant reddish serum, and, on cutting into the brain substance, the gap would soon fill up with serum exuding from the cut surfaces." (Jewell, *Am. Journ.*, July, 1864, p. 131.)

Case IV. "On removing the calvaria a large ecchymosis was found under the pericranium (?) near the sagittal suture. The vessels of the dura mater were filled with dark fluid blood which could readily be pushed aside by the handle of the scalpel. The substance of the brain and of the medulla oblongata was natural in its appearance and consistence. There was no effusion in the ventricles, and the most careful examination failed to detect the slightest evidence of inflammatory exudation." (Dr. Leveck, *Am. Journ.*, July, 1864, p. 136.)

Case V. "The brain was found much congested, the veins being distended to their utmost capacity; there was a small amount of serum effused at the base of the brain, and there appeared to be a slightly softened condition of the upper portion of the spinal cord." (Jenks, *Am. Journ.*, Jan. 1864, p. 283.)

Case VI. "Dura mater congested—some vascular streaks running towards growths on its surface; small group of granulation on left middle lobe. Dura mater adherent to brain at these points. Surface of the brain covered with greenish, purulent matter. * * * Base of the brain covered with a similar substance. The ventricles contained much serum, and the middle corona a little greenish pus. * * * The substance of the brain was congested, but otherwise apparently healthy." (Edes, *Am. Journ.*, July, 1864, p. 275.)

of serous fluid. The vessels of the pia mater are generally more numerous, distended, and tortuous. * * * Injection of the substance of the brain is not unusual. * * * the bloodvessels are not only more distended but more numerous." "The cerebellum seldom exhibited any alteration, if we except that of the membranes at the base of the brain and the effusion with which it is frequently associated. *When the medulla oblongata is divided, so as to allow the removal of the brain, a quantity of serous fluid escapes from the vertebral canal, in those cases in which there has been considerable effusion in the ventricles. The membranes which envelop the spinal cord have been occasionally found vascular, the substance of the medulla spinalis at the same time injected and softened.*" "With regard to the proportion of cases of fever (typhus) in which lesions of the brain have been discovered after death, Louis, in his recent work, states that in more than one-half the pia mater was injected with blood; in three-sevenths the cortical substance was redder than natural, in sixth-sevenths the medullary matter was injected." "*Of 54 cases, examined at the London Fever Hospital, 37 exhibited evident traces of previous inflammation of the brain.*" (Tweedie, *Cyc. Pract. Med.*, vol. ii. p. 166. Art. Typhus.)

I would state that the six cases of the *post-mortem* appearances of the brain, in the present disease, comprise *all* reported in the journal referred to for the past eighteen months. I have no comment to make upon their comparison with typhus, other than that it rather appears as if the latter disease exhibits more evidences of inflammation within the cranium than does "cerebro-spinal meningitis."

2d. The frequency of coma and convulsions in this disease, and their asserted rarity in typhus: The supervention of coma is advanced as one of the evidences of the meningitis, in which our epidemic is said to consist; and death being usually preceded by that symptom, the fact has been regarded as diagnostic between it and typhus. In the first place, coma, itself a mere grade of stupor, "may be produced at any time by pressure within the brain, whether proceeding from vital causes forcing too much blood into the cerebral vessels, or giving rise to effusion within the cranium;" or from "mechanical causes, as depression of the bone," "from a direct sedative impression," "from a sympathetic irritation extended to the brain," "from the admission of venous or carbonated blood into the arteries of the brain." (*Wood*, vol. ii. pp. 674-675.) Coma, it is thus seen, is far from being necessarily symptomatic of inflammation of the brain, though it may be occasioned by it through some of its consecutive effects, as "forcing too much blood into the cerebral vessels, or giving rise to effusion within the cranium." But even these effects are equally the consequences of congestion and a carbonated state of the blood; and from the mere presence of serum within the ventricles or under the arachnoid, we are by no means justified in necessarily assuming that it is the result of inflammation. "This phenomena of imbibition may, in the case of solutions, holding in suspension very finely divided molecules of solid matter, be very valuable for ascertaining the different qualities of the blood according to its density. *In fact in certain maladies its density and viscosity are much diminished, and in these cases serous infiltrations take place.*" (*Matteucci*, *Pareira's* edit., p. 35.) But, even admitting the effusion to be the resultant of inflammation, I have shown by the comparison instituted that it takes place equally as often in typhus. It has been said that patients never die of coma in typhus, but that they always do so in this disease. Let us consult the record. Dr. Wood says: "The characteristic stupor of the disease becomes more and more developed. *Sometimes it deepens into profound coma.*" (Vol. i. p. 350.) Dr. Gerhard says that in the Philadelphia epidemic of 1836, "the delirium became more tranquil, and was exchanged for ordinary stupor or coma when the fever was at its height." (*Bartlett*, p. 195.) Again, "the stupor rarely passed into complete coma *except in fatal cases, hence coma was always an unfavourable sign.*" (*Idem*, p. 197.) "The progress of the disease to a fatal termination is indicated by a more or less profound coma." (*Tweedie*, *Cyc. Pract. Med.*, vol. ii. p. 164.) "But we have a compound of coma and asthenia in which coma takes the lead." (*Watson*, Third edit., p. 942.) As particularly applicable to our present epidemic: "The cerebral complication is known by the more marked and early affection of the brain, more constant delirium and disposition to coma." (*Cyc. Pract. Med.*, vol. ii. p. 165.) "In some malignant epidemics the nervous system is overwhelmed at once in the very outset by the force of the poison. * * * The coma rapidly augments, and death may

ensue within twenty-four hours." (Watson, Third edit., p. 942.) From this it would appear that coma, so far from being an *unusual* termination in typhus, is in reality the *common form of death* in that malady, and that any distinction based upon this fancied deviation must also be abandoned. Coma is simply to be ranked amongst the ordinary grave and unfavourable symptoms of typhus.

Next as to convulsions: they certainly occur in our epidemic more frequently than in typhus as it ordinarily appears; but they are not at all necessarily symptomatic of meningitis, being in fact much more frequently occasioned by other conditions, as "strong and sudden emotion," "excessive heat," "exposure to cold," "the result of an irritation transmitted to the brain from some other part of the body," "indigestion," "too great vascular fulness," "nervous irritation," "vascular irritation or active congestion," "depression of the brain," "an impoverished state of the blood," "an excess of carbonaceous matter." (Wood, pp. 668, 683, vol. ii.) It is thus seen that convulsions are not a conclusive symptom of meningitis, and the fact is that they do sometimes occur in typhus; thus Dr. Wood says: "In some rare instances death is preceded by convulsions." (Vol. i. p. 351.) But the presence or absence of convulsions by no means argues the operation of distinct causes, for the same poison that occasions stupor and coma in one individual, may produce convulsions in another; a familiar example of this fact is witnessed in the effects of alcohol, whose ordinary action, when taken in excess, is to bring on stupor or coma, but which, in a certain proportion of cases, produces convulsions or drunken spasms. But if the presence of convulsions neither necessarily argues difference in the active poison, nor is itself conclusive evidence of inflammation, then in the absence of a more marked difference between the two diseases in the lesions caused by that process than is indicated by the comparative table, they lose their force as a diagnostic symptom. I think that some explanation of their frequency might be referred to the suddenness and intensity in the action of the febrile poison in our present epidemic. "There is a 'vis insita' in our organism which acts in a conservative sense, and protects it from injurious agents." If the action of these agents be gradual, it is insensibly weakened, and imperceptibly yields, until all the graver phenomena occur without being thrown into actual throes of resistances. But if (as shown in this epidemic, by the early appearance of the petechiæ, the coma and convulsions) the power and concentration of the poison be great, the conservative energies and nervous sensibility being yet materially uninjured, the system makes violent struggles before yielding to the fatal influence of the miasm.

If the foregoing views be correct, if it has been shown that those differences between the two diseases that have been relied upon as the basis of a differential diagnosis, are either simply differences in degree, or vanish upon a closer inspection; and that no phenomena exist in our present epidemic that cannot be rationally referred to the operation of the causes that occa-

sion typhus, then we are not authorized in separating them, nor in applying the name of "cerebro-spinal meningitis" to the prevailing malady, unless, indeed, we add a spirit of improvement to that of innovation, and so also designate typhus fever.

Admitting that our epidemic is one of typhus, it remains to endeavour to account for its departure from the ordinary type of that affection; and this, I believe, may be explained by the application of the following truth: "On the most general view of the subject, numerous conditions will be found capable of giving different aspects, even to the effects of a common cause of disease, *the incidental direction of the morbid cause to some particular organ or texture of the body, and still more the quantity and intensity of the virus itself*; all these and other circumstances may be conceived as producing such modification." (Holland, *Notes and Reflections*, pp. 87, 88.) Our text-books abound in the phrases of "determination to some special organ," "complication of some local lesion," "modification caused by the particular portion of the system affected," yet in few of them have we accurate and specific accounts of the actual alterations in disease occasioned by these determinations, complications, or modifications. We all know that the same disease assumes different forms in different epidemics, by virtue of "the incidental direction of the morbid cause to some particular organ or texture;" we admit the fact, for the knowledge of it is as old as Hippocrates, but we do so too often in only a general sense, and not in the application of it. Now, it is exceedingly desirable, in investigating the nature of any disease, that our expressions should correspond in our minds to certain definite ideas, because we can only thus discover those essential qualities that are to be the basis, not only of its proper treatment, but of our attempted prophylaxis. Accounts of many different epidemics of typhus are given, complicated with a lesion of some particular organ. Would we not naturally expect the disease to have such modifications produced in its regular and ordinary symptoms as might be dependent upon the perturbed functions of the organ affected? And if the determination to the organ was sufficiently potent to occasion its inflammation, would we not naturally expect to see the evidences of that action after death in addition to the pathological changes usually observed in the disease? Would we not expect its ordinary duration to be shortened, and the mortality to be increased in proportion as the organ implicated was important in its influence over the maintenance of life?

Let us apply this to the theory of our present epidemic, being typhus with a local tendency to the brain; and those very differences, supposed to justify their separation, are really just what we would rationally look for in consequence of the complication. We would expect an increase of those functional disorders of the brain so characteristic of typhus; the stupor to deepen into coma; the subsultus to be magnified into convulsions; death to be more frequent and earlier, and our post-mortems to exhibit

greater and more decided evidences of disease within the cranium; and these changes to be still more marked, when, as is probably the case in our epidemic, the poison is either concentrated, or there exists a prevailing susceptibility to its influence. I have not attempted to discuss the subject of contagion, as connected with this disease, because the facts are too few and observation has been too incomplete to authorize any decided opinion. In seeking for the cause of this determination to the brain would the conjecture be hazardous that refers it, in part, to the mental tension engendered by the gigantic intestine contest that has afflicted our country for the past four years? May not the storm of political strife, the feverish speculation, and thirst for gain, the anxiety for the absent, the sorrow for the dead, the almost delirious excitement and passion, that have ruled the minds of men during these turbulent years of suffering and bloodshed; may not these emotions have contributed to invite the action of the morbid cause to that organ, which is itself the seat and instrument of all our thoughts and feelings?

In conclusion, as appropriate to the discussion and irreconcilable opinions that have been, and are being recorded, concerning this disease, I would say, in the language of Sir Henry Holland: "Hasty and imprudent belief may here become a cause of serious mischief, the wider in its spread as the minds most prone to this credulity are those most ready also to publish to the world their premature conclusions, and thus mislead the many who found their own practice upon faith in others, or *who seek after novelty as if this were in itself an incontestable good.*"

FREDERICK CITY, MARYLAND, JULY 20, 1865.

ART. VIII.—*On the Treatment of Gunshot Injuries of the Head.* By JOHN ASHHURST, JR., M. D., one of the Surgeons to the Episcopal Hospital, and late Executive Officer to the Cuyler U. S. A. Hospital.

IN the number of the *American Journal of the Medical Sciences* for July, 1864, I reported a number of cases of injuries of the head, occurring in civil life, in which operative treatment had been avoided, and from which I ventured to infer that the employment of the trephine was in most instances of but questionable utility.

The cases which I have included in the present paper are of injuries received by gunshot wound, and are therefore of the class in which trephining is generally represented as especially indicated. They came under my observation in the Cuyler U. S. A. Hospital, and it is from the notes of the medical officers of that hospital that my reports are compiled. In two of the five cases recovery ensued, a fair proportion when the severity

of the injuries is considered; while in those which terminated fatally the *post-mortem* examinations showed, I think, most conclusively, that no more favourable result could have been anticipated from operative interference.

The first three cases are of gunshot fracture, and the others of gunshot contusion of the skull.

CASE I. *Gunshot fracture of frontal bone; ball lodged; death from cerebral abscess.*—Simon S. B. Sholl, private, Co. E, 82d Pa. Vols., aged 21 years, and by occupation a farmer, entered the Cuyler Hospital on May 31, 1864, suffering from a wound of the head received in the battle of Spottsylvania. When first wounded, he had fallen stunned, and had remained insensible for some little time. When seen by Dr. John M. Leedom, in whose ward the patient was placed, and who has furnished the notes of this case, he appeared much depressed and exhausted, becoming towards evening feverish, and complaining of pain in the top and back of the head. He was found to have been wounded in the forehead, the ball entering over the left orbit, and having been apparently removed by a counter-opening from a corresponding point on the right side. It appeared probable, from a careful examination of the parts, that the ball had perforated the frontal sinus on both sides, making its exit without inflicting injury on the cerebral mass itself.

For two weeks or more the only prominent symptoms were headache, obstinate constipation, and vomiting; these were afterwards succeeded by insomnia and great jactitation. The treatment consisted of the administration of a mercurial purge at the beginning, and the use afterwards of diaphoretics and the topical application of cold. On the morning of June 18, the patient was found in an almost completely comatose condition, a state of things which was as unexpected as it was alarming. The left pupil was contracted, while that of the right side was widely dilated, and both insensible to light. The patient could with difficulty be roused sufficiently to protrude the tongue when desired to do so, and immediately relapsed into his previous unconscious condition. He remained in this state until his death, which ensued about 1½ P.M. the same day.

An autopsy was made forty-five hours after death, with the following results: Rigor mortis unusually well marked. The only external lesions noticed were the wounds of entrance and exit in the forehead, before described. The calvaria being removed, the membranes were found to present a fine arterial injection, the venous trunks also being considerably engorged. The brain itself presented a moderate degree of interstitial congestion.

A large abscess was found in the lower part of the anterior lobe of the right hemisphere, extending backward, and opening into the lateral ventricle on the same side. It was found that the ball had produced a fracture of the frontal bone a little to the left of, and involving the median line, making an opening three-quarters of an inch long by half an inch wide; the ball had been split into two portions, one finding its way beneath the integuments of the forehead, and having been extracted on the right side, as before described, and the other entering the cavity of the cranium, splintering the *crista galli*, and lodging immediately over the ethmoidal cells, the roof of which it had partially destroyed. Several spiculæ of bone were found penetrating the membranes, and a small clot surrounded by old coagulable lymph showed at once the original seat of injury to the brain, and the point at which suppuration had begun. The abscess was of the

diffused variety, with shaggy walls, and contained about three ounces of greenish flocculent pus, mingled with broken-down brain-substance. The left lateral ventricle contained a small amount of serum, but was not the seat of any morbid change. No abnormal appearances were observed in the thoracic viscera, while those of the abdomen were not examined.

A point of interest in this case was the rudimentary state of the frontal sinus, an anatomical variation from the customary condition to which may probably be attributed the fatal result, since the portion of ball which in this case penetrated the cranium would, in an ordinary skull, have lodged in the frontal sinus, and might have become encysted, or could possibly have been removed without injury to the internal table or true cranial envelope.

CASE II. *Compound depressed fracture of parietal bone, from a gunshot wound; recovery.*—[The notes of this case were furnished by Dr. W. R. Duntun and Dr. R. N. Downs, who successively had charge of the patient.] Josiah Reed, private, Co. F, 148th N. Y. Vols., was admitted to Cuyler Hospital, June 13, 1864, having been wounded ten days previously by a musket-ball at the battle of Cold Harbour. He was found to have sustained a compound fracture of the cranium on the right side, involving the superior posterior angle of the right parietal bone, with considerable depression of the fragment. He stated that when wounded he became immediately paralyzed, and so continued for about five hours, when the paralysis gradually passed off. When first seen in this hospital, he complained of headache, without stupor or delirium, and was able to answer questions correctly, though slowly. He had a sensation of weight and tingling in the foot and leg of the left side, and the motions of this limb were somewhat impaired. The left arm was less affected than its corresponding lower extremity. The tongue was slightly drawn towards the left side; the pupils natural, and sensitive to light. There was slight nausea, but never absolute vomiting; the pulse about sixty beats to the minute, and full, but not strong.

This condition lasted without much change (except a slight diminution of paralysis) until the beginning of July, 1864, when an increase of dulness and headache, and a decided icteroid tinge over the whole body, rendered the prognosis as to the ultimate result more serious than it had previously been considered.

A careful examination of the local injury now showed that a considerable portion of bone was detached, and lying within the wound. The soft parts were therefore cautiously divided upon a grooved director, and all sequestra that could be reached removed. The largest fragment was fully one inch in length, and half as broad, and involved the whole thickness of the bone. A considerable amount of fetid pus now flowed from the wound, and the dura mater, covered with healthy granulations, could be seen at the bottom of the cavity plainly transmitting the pulsations of the brain. The patient was ordered to be kept in bed, with the head elevated, and cold fomentations to be constantly applied. Low diet and occasional mercurial and saline purges constituted the rest of the treatment. From this time he recovered without a bad symptom, the wound being entirely healed on Sept. 30, with the scalp puckered into and nearly filling the gap in the skull. The patient might now be considered as entirely well.

CASE III. *Gunshot depressed fracture of temporal bone, proving fatal on fifteenth day.*—Montellion Smith, private, Co. H, 5th Vt. Vols., 39 years of age, was admitted to Cuyler Hospital, Oct. 24, 1864, suffering apparently from a flesh wound merely of the scalp. He stated that he had been wounded five days previously, by a conical ball, at the battle of Cedar Creek, being stunned, and having remained unconscious for some little time. The ball had been extracted on the field. His general condition, when first seen in this hospital by Dr. C. R. Prall, who had charge of the patient, was favourable, there being no symptoms to lead to any special anxiety as to the result of the case. Two days later his mental condition for the first time excited attention and gave rise to apprehensions as to the final issue. His memory had begun to fail; he would begin a sentence, and forget what he had to say before he had completed it. This was followed by difficulty of articulation, and sopor, with muttering delirium. The pupil of the left eye was much contracted, and the urine passed involuntarily.

On the 28th, in the presence of the surgeon in charge, the wound was enlarged, and an extensive fracture of the cranium found, with an opening through which the finger could be passed into the brain. The patient was now placed upon absolute diet, and cold continuously applied to the head. Life was prolonged without much change until Nov. 3, ten days subsequent to admission, and fifteen days after the reception of the injury.

An examination of the head was made twelve hours after death, with the following results: There was a ragged wound of the left side of the scalp, communicating with a comminuted depressed fracture of the squamous portion of the left temporal bone, several osseous fragments having been forced into the brain-substance itself. The dura mater in the neighbourhood of the wound was disorganized and coated with a purulent and lymphoid deposit. There was an abscess containing about an ounce of pus in the middle lobe of the left cerebral hemisphere, extending to, though not opening, the lateral ventricle of the same side. The brain throughout presented considerable interstitial congestion.

Remarks.—The question which is especially to be investigated in these histories is, whether any better result could have been anticipated, had their subjects been submitted to the use of the trephine.

The patient whose history is recorded in the first of the above cases presented evidences of cerebral irritation indeed for some time, but symptoms of compression, which are usually thought to demand operative interference, did not appear until the last day, and even then the patient could be temporarily aroused from unconsciousness; and yet the *post-mortem* appearances showed how impossible it would have been to save life by any interference at this time, while at no previous stage of the case were there any indications for a treatment different from that pursued; it being, in fact, believed that the ball had been removed, and had not really entered the cranial cavity.

The second case presents in a most satisfactory manner the favourable results to be hoped for from conservative treatment. The great danger attending the use of the trephine is probably owing to the admission of air to the contused and lacerated membranes and the brain, and it may be remarked in passing that those cases in which the injury itself has so

destroyed the skull-wall as to admit air freely, permit the removal of loose fragments and the use of the elevator, if it should be deemed necessary, without trephining, and furnish an ample opening for the escape of blood or the products of inflammation. If, now, as in the case under consideration, there be no communication between the cranial contents and the external air, there is reason to hope that the process of repair will be conducted to a certain extent as after subcutaneous injuries or operations; and that if exfoliation takes place, and sequestra must eventually be removed, it will not be until the meningeal surface has been converted into a healthy granulating tissue, and is thus enabled to bear the access of air without risk of injury. Thus, in Reed's case, owing to the impaction of the depressed fragments of bone, the wound, as far as the brain and its membranes were concerned, was practically a subcutaneous injury, and air was not admitted till after a month, when the broken fragments had become loose, and upon removal showed the dura mater covered with healthy granulations. Had an over-zealous surgeon, fearing compression and all its catalogue of dreaded consequences, hastily trephined this man upon discovering that he was the subject of a compound depressed fracture, I very much doubt whether the result would have been as gratifying as it proved under non-interference.¹

The third case above recorded presents, like the first, one of those unfortunate instances where the autopsy shows only how useless any mode of treatment must have proved. The patient manifested no cerebral symptoms whatever until within eight days of his death, and yet the report of the autopsy shows that the membranes were disorganized, the brain throughout interstitially congested, with bony fragments deeply imbedded, and containing an abscess of considerable size. That these morbid changes could have

¹ In expressing the opinion that the access to the cranial contents of atmospheric air, and of the irritating particles with which it is habitually loaded, is fraught with danger in injuries of the head, I do not wish to be supposed to assert that the contact of air with *healthy* serous or synovial surfaces is attended with the evil consequences which were formerly attributed to it.

I am well aware that the pleura and peritoneum have been opened frequently without any bad results, and that free incisions into the joints are recognized as proper in certain conditions of joint wounds and injuries. But the point which I wish to bring out is, that the process of repair in wounds of serous as of other tissues will go on better without the access of the external air than with it; and a familiar instance is that of a fractured rib. The pleura is frequently wounded in simple fractures of the ribs, as shown by the presence of pneumothorax and emphysema, and yet such cases are not usually attended with much danger; for, although the pleural cavity may be distended with air, it is not with external or atmospheric air, loaded with dust, organic particles, or other impurities; but a compound fracture of the ribs, with the pleural cavity exposed, is an extremely serious injury.

So, again, a simple fracture through the condyles of the femur, involving the knee-joint, will commonly be recovered from without difficulty; but a compound fracture of the knee-joint will usually cost the patient his limb, if not his life.

been prevented by any operation, I confess appears to me in the highest degree improbable.

CASE IV. *Gunshot contusion of parietal bone; recovery.*—John Binder, private, Co. D, 114th Pa. Vols., 23 years of age, and by occupation a shoemaker, was wounded at the battle of Gettysburg, Pa., and entered the Cuyler Hospital, July 6, 1863. The early history of his case cannot be obtained, his condition preventing him from giving any satisfactory account of himself, and there having been no record kept by the medical officer who had charge of him when first admitted. When seen by Act'g Assist. Surg. R. N. Downs, U. S. A., from whose notes this report is compiled, he was found to have had a severe wound of the left side of the head, involving the loss of a portion of the parietal bone about the size of a silver dime. This fragment consisted of the external table of the bone merely, and presented evidence of having received a severe blow, being slightly indented. The pulsations of the cerebral mass were visible through the aperture in the skull, showing that the loss of substance had extended through the entire thickness of the bone; the inner table having probably come away in small pieces with the discharge.

At no time while this man was under observation were there any alarming constitutional symptoms, neither convulsions nor delirium being present, and the only abnormal mental phenomena being hebetude, loss of memory for recent events, and a reticence almost amounting to moroseness. The treatment consisted in perfect rest, low diet, the periodic administration of mercurial and saline purges, and at first small doses of tartarized antimony. The wound rapidly healed under simple dressing, and the constitutional symptoms diminished at the same time. This man was afterwards transferred to the second battalion, Veteran Reserve Corps, and served as an attendant in the ward.

CASE V. *Gunshot contusion of parietal bone; death from meningitis of the opposite side.*—Wm. Smith, private, Co. G, 4th N. Y. Heavy Artillery, 18 years of age, entered Cuyler Hospital, April 9, 1865. This soldier stated that he had been wounded in action, March 31, 1865, as he supposed by a conical ball. He had been treated at Emory Hospital, Washington, D. C., previous to his entrance into this hospital. His wound had not excited any particular attention, nor caused special alarm either to himself or to those who administered to his wants. When first seen in this hospital, he was found to have received a gunshot wound of the scalp in the left parietal region, penetrating to the bone, but not, so far as could be ascertained, accompanied by osseous lesion.

During the first week after admission the patient appeared to be progressing towards recovery, and it was not until the 16th, more than a fortnight from the date when his injury was received, that his condition began to excite any alarm.

At this time the patient had two or three slight convulsive paroxysms, lying in a somewhat soporose condition during the intervals. He afterwards became delirious, and finally almost completely comatose. The day preceding his death the muscles of the left side of the body (that of the wound) were observed to be in a state of spasmodic contraction. A large collection of pus formed beneath the left side of the scalp, anterior to the wound, and was opened the day preceding the final issue.

The pathological condition was supposed to be, that an abscess, resulting

from the original shock to the brain-substance, was exciting irritation, and would probably eventually burst into one of the lateral ventricles.

Mercurials, tartarized antimony, and the fluid extract of veratrum viride were exhibited internally, while the head was kept somewhat elevated and covered with cold fomentations.

Death ensued on the night of April 30, 1865, twenty-one days after the patient's entrance to this hospital, and just one month from the reception of his injury.

An autopsy was made about fourteen hours after death, with the following results: There was no fracture of the skull to be detected when the scalp was removed, and the bone was not bared beneath the abscess which has been described as having formed a few hours before death, but was manifestly necrosed just below the original wound.

On removing the skull-cap, it was found that a plate of bone about one inch long and three-quarters of an inch broad had been separated by exfoliation from the inner table, and was adherent to the dura mater immediately beneath the position of the original scalp wound. The brain was removed with the membranes entire, but a moderate quantity of blood and serum being found between the dura mater and the skull. On reflecting the dura mater of the *right* hemisphere, the arachnoid over the middle lobe of the cerebrum was found to be acutely inflamed, presenting an abundant deposit of soft coagulable lymph. The membranes of the left side presented merely a slight pearliness, and the adhesion of the dura mater to the sequestrum, already referred to.

The brain-substance on the right side was healthy; on the left side it was softened beneath the position of the wound, and at the depth of about three-quarters of an inch was a small abscess, not larger than a small hickory-nut. All other parts of the body examined appeared normal.

The muscular contraction on the same side of the body as the wound was now accounted for by the existence of intra-cranial disease upon the opposite side. Three important questions are suggested by the above history, viz:—

1. Why should a wound of one side of the head produce meningitis of the opposite side?

2. Had the patient not died of meningitis, might not the cerebral abscess have become encysted or absorbed, and life have been prolonged for perhaps several years?

3. Would not the skull eventually have exfoliated in its entire thickness, permitting the escape of *débris* externally, and allowing the wound to heal as in the preceding case?

Remarks.—The whole subject of contusion of bone has been recently so ably and fully discussed in this Journal, by Dr. Lidell, U. S. V., that it will not be necessary in this place to consider any point except that which forms the particular subject of the present inquiry, to wit, the applicability of trephining to cases such as those recorded above. And here it may be remarked that in cases of contused skull the brain and its membranes are even more liable to injury than where actual fracture has taken place, for in the latter the force of the blow is expended on the bone, and its more important contents may escape with comparative impunity. And hence the exposure of the cerebral mass to the atmospheric air is at least as

much to be dreaded in cases of contusion as in those of fracture. The only plausible argument in favour of trephining in such a case is to afford an exit to the products of inflammation or other effused materials, and here I think the last case reported is peculiarly in point, as illustrating the absolute uncertainty of any such result being accomplished by the operation. Death in this case resulted from meningitis upon the opposite side to that of the wound, and but for this complication (upon which trephining certainly could have produced no favourable effect), it would appear that the life of the patient might have been indefinitely prolonged, the small abscess in the left side of the brain being encysted, or absorbed and cretified, and the dead plate of bone above being thrown off by the natural process of exfoliation.

To sum up, then, the conclusions which I would draw as to the proper treatment of gunshot injuries of the head are as follows:—

I. In the large number of cases which die under conservative treatment, it does not appear from the autopsies that the use of the trephine could in any way have averted the fatal issue.

II. Many cases which, like those numbered II. and IV. in the above list, recover without trephining, would be seriously jeopardized by rashly admitting the atmosphere to the torn and bruised cranial contents, and thus placing them in the unfavourable circumstances of an open wound, instead of leaving them in the safer position of a subcutaneous, or, more strictly, “subosseous,” injury.

III. In those cases which recover after the use of the trephine, the instrument does not deserve the credit of the cure; for if there be already an opening through the skull, the operation is unnecessary; and if there be not, it adds to the already serious injury a most dangerous complication.

IV. There is a close analogy, though often forgotten, between trephining and the resection of long bones. In compound fractures of the extremities we extract loose fragments, restore the others as nearly as possible to their proper places (“setting” the fracture), and then trust the case to nature. Just so, in compound fractures of the skull, it seems to me, we should content ourselves with removing the detached portions of bone, and restoring the rest, if possible, by the elevator or otherwise, to their proper level, and then withhold our hands; conducting the after-treatment upon physiological and rational principles. Trephining is the most serious and fatal of all resections; and I believe the day will yet come when it will be looked upon as a matter of curious and antique surgical history, rather than as an actual and established mode of surgical treatment.

ART. IX.—*Ligation of Common Iliac Artery: Sequel of Case of Ligation of External Iliac Artery for Aneurism of the Femoral Artery.*

By JAMES B. CUTTER, M. D., of Newark, New Jersey. (With a wood-cut.)

IN the July number of this Journal for the year 1864, I published the case of ligation of external iliac artery for femoral aneurism. At the time of publication this case was progressing favourably, with every indication of a speedy recovery, but, during the progress of the case subsequent to my report, unlooked-for symptoms were developed which had so important a bearing on its termination that the case would remain not only incomplete, but of no practical value without a full report to its termination. An accident occurred during the treatment of the case which we failed to note (not considering it of sufficient importance at the time), but which since proved of very serious import, and in consideration of this fact, with others of equal importance and interest, we take the liberty of presenting a *résumé* of the case with appended notes.

Geo. Clark, private, 4th New Jersey Regiment, a large muscular man, in vigorous health, whose average weight is two hundred pounds, accidentally wounded himself with the large blade of a pocket-knife in the inner side of the left thigh, about two inches below Poupart's ligament, the blade entering the femoral artery and vein, near the origin of the profunda.

His recovery was rapid, resuming his usual occupation (that of a farmer) in a week after the receipt of the injury. He never experienced any pain or difficulty after his recovery, except a pricking pain at the wounded point upon unusual or excessive walking, until August, 1863 (eight years after the receipt of the original wound), when, as the result of hardship and a long fatiguing march, his limb suddenly swelled so as to measure thirty-two inches in circumference. The patient was transferred in a few days after the swelling commenced to the Field General Hospital at Warrenton, Virginia, and while there suffered the most agonizing pain in the inner side of the thigh, directly over his former wound; this pain continued two or three days without intermission. From this hospital, he was sent to Washington, D. C., and thence to Newark, New Jersey, Hospital.

When admitted, the whole limb was greatly enlarged, with remarkable distension of cutaneous veins. While in the Newark Hospital, he was examined by a number of surgeons of eminence and position, none of whom had a suspicion of aneurism; some supposed there might be a tumour in the pelvis, making pressure upon the iliac vein. He never complained of pain in the region of the aneurism, except for three or four days at General Hospital, as above mentioned, and could never recall any circumstance that would be likely to give rise to such a condition of the limb.

The patient came under our observation some three months after his admission, and was made the subject of *special study*. He was repeatedly interrogated about his previous life and habits, about every accident that ever happened to him, no matter of how trivial a character it might seem to be; finally, after much labour, we recalled to his mind the accident that happened to him eight years before. After ascertaining this fact, our attention was directed to aneurism, and upon placing the ear upon the small scar so distinctly marked upon the thigh, we recognized the tumour to be aneurismal. 1st. By its peculiar thrill on firm pressure with the hand; and, 2d, by the aneurismal bruit so distinctly heard when the ear was applied to the thigh. After the diagnosis was made, the patient was examined by a number of surgeons, and the diagnosis of aneurism confirmed.

The operation for ligation of external iliac artery was performed on Saturday, February 6th, at a quarter of three P. M., assisted by Dr. J. F. Miner, of Brooklyn, N. Y. There were no complications in connection with the operations, except the superficial venous hemorrhage, which was *enormous*, and was remarked by a number of surgeons present as being the most abundant venous hemorrhage they ever saw. The characteristic feature of this venous hemorrhage was that it seemed to be confined almost exclusively to the integument, from the *entire* cut surface of which it flowed in a *continuous* and *copious* stream, retarded *slightly* (controlled it was not) by firm pressure.

The patient made a good recovery, the ligature coming away on the 25th day.

A day or two after the operation, a small spot of dry gangrene made its appearance upon the heel, notwithstanding considerable pains had been taken to prevent such an occurrence. It gave the patient no inconvenience whatever, excited no fear on our part, and being considered of such trivial importance, we failed to make note of it.

We will now continue our notes from last report (April 25, 1864). At that time the patient was moving about the wards, and expressing himself as "never having felt better in his life."

June 19. The whole limb for the last few days has been gradually increasing in size, the cutaneous veins that disappeared so soon after the operation are now becoming distended, the whole limb presenting the same appearance that it did previous to the operation. This morning, upon applying the ear to the thigh in the neighbourhood of the old cicatrice, the "aneurismal bruit" could be distinctly heard, the sound being communicated through the artery for some distance above and below the wounded point. As the dead mass upon the heel has nearly separated from the healthy tissue, we have removed it with forceps and scissors, and the sore dressed with simple cerate.

20th. Hospital gangrene having made its appearance in the hospital—for fear that he may be made a victim to its destroying influence—he has

been placed in a small ward by himself, and every precaution taken to prevent his exposure.

25th. Hospital gangrene has attacked the small sore upon the heel, and caused considerable destruction to the healthy tissue about. Tonics and stimulants are given freely. Bromine applied *pure* to the wounded surface after removing slough, followed by yeast poultices.

30th. Wound granulating nicely, patient otherwise doing well.

July 25. The whole limb has been steadily increasing in size, and is at present *enormously* distended. Gangrene has attacked the sore upon the heel again; destruction of tissue very extensive.

August 1. Patient doing well; reparative process going on rapidly. Tonics and stimulants have been given freely, and are continued.

24th. Patient has had still another attack of hospital gangrene in the heel, which has made a very extensive wound, opening the ankle-joint at one point, uncovering some of the bones of the foot. The os calcis protrudes from the wound some distance, and is mostly diseased.

These repeated attacks of gangrene reduced the patient's general strength, and had he not a *remarkably* vigorous constitution, we think he would have succumbed to these repeated attacks of this horrible and destructive disease.

Since the beginning of June, the foot, leg, and thigh have become *enormously* distended; the superficial veins are much enlarged, much more so than previous to the operation; the superficial circumflex iliac, superficial epigastric veins, and the superficial veins over the hip are *very much* distended.

The thigh measures thirty-seven inches in circumference at its largest point; the foot and leg measure in proportion. There are a number of openings upon the thigh which have lately put on a gangrenous appearance; the serum of the blood exudes through the openings to such an amount as to completely saturate his bed during the twenty-four hours that the patient remains upon it; the pain and inconvenience of being moved are so very great, that his wishes have been gratified in regard to having his wound dressed but once during the twenty-four hours.

During the last few days the patient has been examined by a number of surgeons from New York, Brooklyn, and this city, and all agree upon the propriety and justice of another operation, as the patient's suffering is *extreme*, and it is *his* wish, as well as that of his parents, that something be done for his immediate relief. The probabilities as to the result of the operation being made known to the patient, his *full* consent having been obtained to have it performed, Monday, September 17, is set apart as the day for the operation. Accordingly, preparations were made, and at 3 o'clock P. M. of the above date, in the presence of a number of medical gentlemen of New York and this city, and kindly and ably assisted by my former pre-

ceptor, Prof. Jo. C. Hutchison, of Brooklyn, N. Y., the patient was placed upon the operating table, and anæsthesia produced by a mixture of ether and chloroform, and the operation for the ligation of the common iliac artery commenced. An incision six inches in length was made just above the old incision made for the ligation of the external iliac artery; the abdominal muscles were carefully divided until the fascia transversalis was brought plainly into view; it was found firmly fastened to the peritoneum, which was very much thickened, and firmly adhered to the surrounding parts. It was found impossible to separate the peritoneum from the iliac fossa. The peritoneal sac was therefore opened, and the artery secured in that manner. The wound was brought together with silver sutures and adhesive plaster, and dressed as is usual with wound containing a ligature.

The superficial venous hemorrhage was enormous, but of a different character from the venous hemorrhage that took place during the course of the previous operation. The venous hemorrhage at this time was mostly confined to the three or four enlarged superficial veins, divided during the first and second strokes of the scalpel. With very little trouble these veins were secured, and the operation proceeded with.

September 18. Patient passed a pretty comfortable night; this morning has some tenderness over the abdomen, aggravated by wind in the intestines.

Condition of the Limb: Temperature not fallen any; great diminution in its size, having fallen away one-third. Warm application has been made to the foot only.

19th. Patient doing as well as could be expected; has still considerable tenderness over the abdomen; continue the pil. opii; limb still diminishing, is about one-half its former size.

20th. Has regularly taken the pills of opium; is very much prostrated; breathing laboured; pulse 120; face flushed; expression anxious; severe headache; vomiting, which greatly aggravates his pain, has followed every attempt to take food.

21st. Patient appears to be sinking; pulse 140, quick and fluttering; respiration laborious and painful; skin cold and moist; abdominal tenderness great; abdomen greatly increased in size; bowels open this morning; stools free and feculent. Patient continued to sink through the day, and at 3 P. M. was relieved of his sufferings by death, having survived the operation five days.

Sectio cadaveris eighteen hours after death.—The whole surface of the peritoneum was coated with lymph, and there was a small collection of serum. The lymph in some places was in flakes; in other situations it was the consistency of thick gruel, closely resembling pus. No adhesion between the lips of the wounds.

The vessels were removed *en masse*, and after being prepared were sent

to the Army Medical Museum at Washington, D. C. This wood-cut represents the vessels as they are prepared, being taken from a photograph.



a. Abdominal aorta. *b.* Common iliac (left side). *c.* Common iliac (right side). *d.* Vena cava ascendens. *e.* Common iliac vein (left side) obstructed by inflammation. *f.* Point of ligation of common iliac. *g.* Point of ligation of external iliac, with sheath of vessels attached. *h.* Femoral artery. *i.* Profunda branch. *j.* Femoral artery, continued. *k.* Point of communication of artery and vein. *l.* Showing diminution in size of femoral artery below point of communication. *m.* Superficial external pudic artery enlarged. *n.* Enlarged femoral vein. *o.* Internal iliac vein occluded by inflammation. *p.* Internal iliac artery.

Note.—We still claim, so far as the ligation of the external iliac artery was concerned, a success, as given in the statistical table published with the first report of the case, inasmuch as the patient fully recovered from the effects of the operation.

NEWARK, N. J.

ART. X.—*Ligature of the Left Subclavian Artery.* By WILLIAM HENRY CHURCH, M. D., Surgeon to Bellevue Hospital. Communicated by HENRY G. PIFFARD, M. D., House Surgeon to Bellevue Hospital.

G. W., 31 years of age, a native of the United States, and by occupation a police officer, was admitted into Bellevue Hospital on the evening of the 3d of June, 1865.

About an hour previous to admission he had inflicted a gunshot wound upon himself in an attempt at suicide. The weapon was a small policeman's revolver, and the ball conical. The ball entered near the edge of the left pectoralis muscle six inches below the top of the shoulder, and passing through the axillary region emerged at a point opposite its entrance and about one and a half inch from the edge of the axilla. There was very slight hemorrhage from the wounds.

When first seen there was a large tumour in the region of the pectoralis major muscle due to the effusion of blood. The patient was unable to move the arm or hand of the injured side, and sensation in the forearm and hand was very much diminished, though not entirely lost. There was no pulsation in the radial or brachial arteries. The general condition of the patient was good, and he had not lost much blood, as evidenced by a normal pulse at the right wrist.

June 4. The condition good; no hemorrhage since admission; tumour at the upper part of the chest somewhat diminished. At a consultation

held to-day, it was decided "that no surgical interference was called for at present." The arm being somewhat cold was wrapped in cotton, and morphia (*p. r. n.*) given. No pulse at the wrist.

5th. Sensation in the arm almost normal, motion improving, and a slight pulse may be detected.

8th. He has continued to improve; slight healthy discharge from the wounds. The pulse is almost as strong in the left as in the right arm.

13th. Last night hemorrhage occurred from the anterior wound to the extent of $\frac{3}{4}$ vj, arrested by pressure. A consultation being called, it was decided to place a ligature of reserve upon the subclavian, and then to enlarge the original wound and search for the bleeding vessels. Dr. Church immediately proceeded to place the ligature around the subclavian in the third portion of its course (the patient having been previously etherized). The needle and silk were soon passed under the artery, but the ligature was not tied. The wound on the anterior surface of the chest was then enlarged, when, owing to the disorganization of the parts and there being no hemorrhage to guide to the wounded vessel, it was thought impracticable to search further for it. The ligature was tied, and the arm wrapped in cotton, and whiskey and morphia administered.

14th. He has passed a comfortable night and feels very well; slight fever; pulse 116.

16th. Last night hemorrhage occurred from the original wound to the extent of $\frac{3}{4}$ vj. This morning he is very much worse. Pulse small and quick, 150 to the minute. Covered with a cold sweat, and feels very weak. Several spots of commencing gangrene on the arm.

17th. Died at 8.30 A.M.

Autopsy, four hours after death.—The chest was opened, the clavicle removed, and the subclavian was traced from its origin outwards. The ligature was found applied to the vessel just after its emergence from behind the *scalenus*. By further dissecting, the axillary artery was removed, and on examination a wound of this vessel was discovered at a point corresponding to the second portion of its course. There was a large diffused aneurism occupying the axillary region, the upper and outer portion of the anterior aspect of the chest.

ART. XI.—*Oleum Erigerontis Canadensis as a Remedy in Hemorrhage, Diarrhœa, and Dysentery.* By J. W. MOORMAN, M. D., of Hardinsburg, Ky.

THIS medicine deserves to be ranked among the best remedies in all forms of hemorrhage, and in some forms of diarrhœa. With a somewhat extended knowledge of its effects in such cases in private practice, I cannot call to mind a single instance in which it failed to produce the desired effect. In cases of diarrhœa from debility and relaxation I have found it to be a most useful remedy, as also in dysentery, after the stomach and bowels have been relieved by purgatives. In these cases it seems to relieve by increasing

the tonicity of the muscular fibres of the intestines, and correcting the depraved secretions.

To better illustrate its effects, I subjoin a few cases.

CASE I. G. T., aged 18, taken suddenly, on the morning of the 19th of May, with profuse hemorrhage from the lungs. I was called; found him with cool skin, weak pulse, and hemorrhage still very profuse. R.—*Ol. erig.* Canad. gtt. xv; Aqua com. ℥ss. Ft. haust.*, to be taken immediately. At same time ten drops to be inhaled from handkerchief. In half an hour the bleeding had ceased entirely, and did not recur for several months, when it was again checked by the same remedy.

CASE II. Mrs. D., aged 34, after a long and tedious illness with typhoid fever, was taken with hemorrhage from the bowels. I was hastily summoned about midnight, and found her in a sinking condition, having already passed several copious stools of blood. Ordered *ol. erig. Canad. ℥ij*, to be taken at two doses, six hours apart, in an ounce of common water.

Sept. 18 (fifth day after administration). Patient has had no evacuation yet. She is clear of fever; skin moist and cool; pulse 90, rather weak; complains of soreness in left iliac fossa. Ordered enema saponis, which brought away a copious stool of black-looking matter, probably the coagulated blood remaining in the bowel at the time of administration of the oil. After this the bleeding did not recur, and the patient went on to convalescence.

CASE III. Case of typhoid fever, no symptoms of a grave character presenting themselves until the third week, when hemorrhage from the bowels suddenly set in. R.—*Ol. erig. Canad. ℥jss*, to be taken at two doses, four hours apart. No evacuation until the fourth day, when the administration of a simple enema brought away a copious stool of fecal matter and coagulated blood. Patient recovered.

The last two cases may seem rather out of place, as it is thought that the hemorrhage in latter stages of typhoid fever is beneficial, and should not be checked; but in the epidemic in which these cases occurred there were many deaths in persons apparently doing well until the hemorrhage set in. Every case of hemorrhage in which this remedy was not used proved fatal. I have tried it with equal success in menorrhagia, and in hemorrhage attending abortion, and from my experience with it, and a knowledge of the success of others, I think it deserves to be tried by the profession generally.

The dose recommended in the *United States Dispensatory* is from five to ten drops, given every two or three hours; but I have given much larger doses, as will be seen by reference to my cases. Such heroic doses are hardly necessary, unless in very urgent cases. Those in which I used it were already so much debilitated by long-continued disease that they were unable to stand such a large drain upon the sanguiferous system; these doses were resorted to to check the hemorrhage, and offered a last hope for life. It may be given in a little water, to which a small quantity of sugar may be added, if the patient desires it. In cases of hæmoptysis ten or

fifteen drops may be placed on a handkerchief and inhaled, at the same time it is taken internally; the same method will answer in epistaxis. In diarrhœa, fifteen drops every four hours, until it is relieved, will in most cases be sufficient. In dysentery it is always best to precede its use by a dose of castor oil, to remove all irritating matter from the stomach and bowels, and even then, I must confess, I have not obtained the gratifying results which some claim to have derived from its use in this affection. I have, however, in every case derived more or less advantage from its use. In hemorrhages and diarrhœa of debility I know of no better remedy, and I trust the profession will give it a trial and let us know the results.

ART. XII.—*Tinctura Iodini Decolorata as a Therapeutic Agent.*

By N. J. AIKIN, M. D., of St. Louis, Mo.

THIS compound, as an efficient therapeutic agent, is worthy of more attention than it seems to have received from the profession in general. It has been conveniently called "Colourless Iodine." Prof. Simpson was among the first to suggest its use.

The best mode of preparing it is to mix equal parts of the comp. tinct. of iodine and strong water of ammonia. The mixture is at first brown, but after standing a few hours becomes colourless. If the colour does not disappear after twenty-four hours—which may indicate that the ingredients are at fault—add more ammonia, and, perhaps, an excess of one-fourth will be required to effect complete decoloration. When a weaker preparation is desired, it may be reduced *ad lib.* with water or glycerine. It acts on starch under some circumstances, for a slight contact with starched linen produced an instant stain; yet upon thoroughly moistening a little powdered starch with it, the blue colour did not appear. A little camphor dissolved in the tinct. will render it more agreeable to individuals, though it may add nothing to its therapeutical value.

Whenever the external use of iodine is indicated, this can be used with advantage over any other of its preparations in the liquid form. As an alterative, absorbent, counter-irritant, or discutient, it is as neat as well as a reliable remedy.

Applied to the forehead, face, or throat, it produces no annoying disfigurement, and, with the exception of articles of clothing that are starched, it leaves no stain on dressings or apparel. Its effects on enlarged glands are generally most satisfactory. In inflammation where a counter-irritant is desired, as in some cases of pneumonia, it is very useful; it is cleanly, convenient, easily applied, and the degree and rapidity of its action can be readily controlled. (As a *stupe* its direct irritant effects depend principally

upon the ammonia.) It is useful in neuralgia and rheumatism, and for bruises or sprains is preferable to either the "soap" or "camphor" liniment. Acne, long intractable, will yield to this remedy applied several times a day, and used similarly on the first appearance of furuncular eruptions, it will generally arrest their progress, or cause them to disappear altogether. In erysipelas it is a most valuable application, if not superior to all others.

It will readily occur, that this tincture contains no free iodine, but consists of the iodide of potassium, and the iodide of ammonium, in solution in the alcohol, with an excess of ammonia. Now a similar result may be attained by dissolving these salts in any desired menstruum, but the formula suggested is more convenient, like the following: R. Tinct. iodin. comp., Aq. ammon. fortior., āā ʒj; Camphor. ʒj.—M. After the camphor is dissolved, let the mixture stand until it becomes colourless.

This solution is absorbed with great facility. Is the iodine, to any great extent, *absorbed* when a surface is painted with the ordinary tincture or solution? The dryness and contraction of the skin, which it occasions, certainly cannot favour absorption. And premising that the salts of iodine are mostly decomposed in the system, this compound presents greater claims for usefulness in the practice of the healing art.

The correctness of the above remarks may be proved by experiment, which will also as fully demonstrate the superior advantages possessed by the colourless preparation of iodine, as an improved form for a valuable agent gratifies that spirit of progress which seeks for the best remedies in best means and best methods.

ART. XIII.—*Cases of Gunshot Wounds of Abdomen involving Viscera.*

By HENRY DUSENBURY, M. D., Act. Asst. Surgeon U. S. A.

CASE I. *Gunshot wound of liver and kidney; recovery.*—Albert A. Sharer, Corporal Co. "D," 26th Mich. V., æt. 23, American. Physical constitution good.

April 6, 1865, while in an engagement at South Side Railroad, received a gunshot wound: a round ball entering on the right lateral side of body between ninth and tenth ribs, eight inches from median line of body, and continuing its course through liver, and after passing through left kidney, emerging between eleventh and twelfth ribs half an inch from articulation.

He was admitted into Finley General Hospital, Ward 3, April 19, 1865, from hospital at City Point. He states that while in field hospital cold dressings were applied and he was kept quiet.

Upon admission his symptoms were as follows: Some tenderness at points of entrance and exit, and both wounds suppurating kindly. There seems to be a slight hemorrhage flowing into the pelvis of the kidney, which finds its way out with the urine through its natural channel. The patient

suffers but little inconvenience from the wounds. He states that when first wounded he suffered severely with pain in the left testicle and scrotum, and which occasionally ran down the same limb.

May 1. Both wounds are discharging but little, and the urine now contains pus, which escapes in clots. The general condition of the patient is improving.

14th. Was seized with a chill, followed by a fever of a miasmatic origin, with severe pain in region of liver. This was followed by an icteroid hue over the upper portion of the body. This attack subsided in a few days under quinia treatment.

June 1. Wounds healing fast. Patient walking about the ward. Condition improving. Urine contains small quantities of pus.

14th. Last dressing applied. Wounds about healed. Urine nearly normal.

July 26. Wounds entirely closed; slight tenderness in regions of each. The urine is now normal. The patient goes about the hospital, and has walked over a mile with no inconvenience, feeling nearly as well in health as before the injury.

The treatment throughout has been simple dressings.

This case is interesting from the fact of liver and kidney both being wounded, rarely occurring as they do together, with so little detriment to the usual constitutional vigour.

CASE II. Gunshot wound of the abdomen and kidney; recovery.—Michael Savilio, Private Co. "E," 5th N. H. Vols., æt. 27, Russian, married.

Admitted to "Finley" April 19, from City Point, Va. Wounded April 6, 1865, at Farmville, Va., in battle, by a round ball. Physical constitution, at time of injury, good.

Gunshot wound, ball entering on left lateral side, five inches from median line, just outside of ninth rib on a line with the nipple, seven and a half inches below, passing backwards and emerging half an inch from spinous process of twelfth dorsal vertebra on left lateral side.

For a number of days after injury was confined to bed, and complained of severe pain in left testicle, which ran down the limb. There seemed to be at the same time a steady hemorrhage flowing into the pelvis of the kidney, which found its way out with the urine. After the subsidence of the hemorrhage some pus was observed with the urine, which soon disappeared with other aggravated symptoms, when the wounds healed rapidly.

July 1. Wounds entirely healed. A slight tenderness in region of wounds. Patient able to go about without inconvenience.

August 1. Feels no inconvenience from the wounds. Is now doing guard duty about the hospital. Constitution unimpaired by the injury.

FINLEY U. S. GENERAL HOSPITAL, WASHINGTON, D. C., August 1, 1865.

ART. XIV.—*Case of Gunshot Wound through the Pelvis.* By D. WEBSTER PRENTISS, A. M., M. D., of Washington, D. C.

PRIVATE Dennis Driscoll, Co. D., 14th Connecticut Volunteers, aged 22 years, American. Good constitution. Wounded at battle of Hatcher's Run, Virginia, March 25, 1865, by Minié ball.

Wound of entrance : Anterior aspect of upper third of right thigh, six and a half inches below anterior superior spinous process of ileum ; ball passing upwards and inwards into the pelvis, near the obturator foramen, over the urethra, to the left of the bladder, and out of the pelvis at or near the greater sacro-sciatic notch of the left side, striking in its course the ramus of the pubis and spine of the ischium, but missing the pelvic viscera, and finally lodging in the muscular substance of the glutæus maximus, just over the pyriformis muscle.

Previous to admission into the hospital, the only inconvenience complained of on the part of the patient was pain and tenderness in the hypogastric region, and a persistent inclination to evacuate the bowels. The shock of wound was inconsiderable.

When received into the hospital, on the 30th of March, the external wound appeared healthy ; the discharge free, of dark, bloody pus, exhaling a decided fecal odour. The functions of the bladder were normal ; the patient hopeful ; pulse good, at about 90. The ball was discovered in the glutæus maximus of the left side, over the position of the greater sacro-sciatic notch ; the place being pointed out by the patient himself from the pain, though it was not yet sufficiently distinct to justify an incision. The pelvic irritation and tenesmus continuing, a simple injection of warm water and Castile soap was administered, giving temporary relief. Cold water dressing was ordered for the wound.

During the week following, there was but little change in the patient. Irritation of the rectum and peritoneum supervened, when the bowels began to get costive, which was again relieved by the injection. The discharge assumed more the character of laudable pus, but still preserved its fecal odour.

The same state of things continued up to the 15th of April, the ball becoming more and more evident each day, the tumefaction around it increasing until the irritation was beginning to affect the general system. The appetite, which had at no time been very good, was getting worse, and the patient growing restless. A consultation was held, and it was determined to cut for the ball, which was done by Surg. B. B. Wilson, in charge of the hospital, by means of a vertical incision through the glutæus maximus, about an inch to the left of the sacro-iliac synchondrosis, extending from the posterior superior spinous process of the ileum downwards four inches. The muscle, at this point, was torn and bathed in pus. The ball, which had been distinctly felt previous to the incision, was not found in the muscle, but had evidently fallen back into the pelvis through the sacro-ischiatic notch—an accident, the possibility of which had not been overlooked. On introducing the finger into the opening, the internal face of the spinous process of the ischium was found denuded of periosteum and roughened. A small fragment of bone, probably from the process, was removed from the substance of the glutæus maximus.

Exploration being made by means of Nélaton's probe, the ball was discovered at a distance of about seven inches from the orifice, and several ineffectual attempts made to grasp it with forceps ; but it eluded their jaws, and finally disappeared again within the cavity. Subsequent search with probe, discovered necrosed bone at the opposite side of the pelvis where the ball entered, and very soon a fragment was brought out by the forceps, which was evidently from the symphysis of the pubes, having attached a portion of articular cartilage. Further search for the ball proved fruitless, and the patient was removed to his bed, stimulus ordered, and left

for the night. Chloroform was the anæsthetic used, and the operation was borne well.

On the morning of April 16th, the ball was found in bed, having *worked its own way out* during the night. The urine was high coloured and loaded with mucus; pain and tenderness extended over the whole abdomen; inflammation of the bladder and peritonitis were developed. Solutions of morphia and sweet spirit of nitre were administered, and partial relief obtained; stimulants and nutritious diet were continued.

The patient continued to do well under this treatment, the inflammation subsiding considerably, until April 20th, when a hard chill came on, followed by profuse perspiration; the pulse increased to one hundred and thirty, and was weak; the countenance assumed an anxious expression and icterode appearance; the patient grew restless and uneasy, and the mind wandering; *pyæmia* had set in. The stimulus was increased, and beef essence ordered.

On the 23d of April, the condition of things remained much the same; symptoms increased in intensity; pulse one hundred and sixty; retching and vomiting, in addition to other symptoms, treated with morphia. One pint of brandy was taken daily in the form of "eggnog;" the beef essence still continued. Inflammation of the bladder and peritoneum still continued, and the patient continued to sink, and died at 2 o'clock P. M., April 25th—involuntary evacuations occurring towards the last.

He lived thirty-one days after receiving the wound, and ten days after the operation.

Autopsy, held twenty hours after death. *Rigor mortis* well marked. *Heart* normal, large fibrinous clots found in both ventricles and extending down aorta. *Lungs* healthy. *Bowels* healthy. *Bladder* highly inflamed and thickened. *Peritoneum* very much inflamed, somewhat thickened, beginning to turn gangrenous, especially in those portions covering bladder and rectum. *Cavity of pelvis* infiltrated with bloody serum.

Course of ball, as determined by dissection: Wound of entrance, six and a half inches below anterior superior spinous process of ilium; ball passed inwards and upwards, directly through the symphysis pubes, leaving less than half an inch of the arch above united. From here it was deflected slightly downwards, passing over the membranous portion of the urethra, to the left of the bladder, beneath the external iliac vessels and psoas magnus muscle, striking the spine of the ischium, a portion of which was knocked off, impinging on the sacrum at the insertion of the *coccygeus* muscle, and finally lodging in the muscular substance of glutæus maximus.

Remarks.—There are several interesting points connected with this case which remain to be noticed.

1. The fecal odour exhaled in the discharge while there existed no wound to the rectum. That there was no wound of the rectum is *indicated* by the symptoms during life—the bowels being moved naturally, and no fecal matter in the discharge—and *proved* by the *autopsy*.

This confirms the statement of surgical writers, that matter confined in the vicinity of the anus acquires a fecal odour. Velpeau lays particular stress upon this, and asserts that the fecal odour of the pus is no evidence of a direct connection between the bowel and the abscess, the odour transuding through the coats of the intestine. (See *Dictionnaire de Méd.*, vol. iii. p. 311, Paris, 1833; also *American Cyclopædia of Pract. Med.* and

Surg., vol. ii. p. 127, Philadelphia, 1836.) Velpeau published a case (*Archives Générales*, tom. xi. p. 337) in proof of this, and he has since met with several others. Bassereau relates similar cases (*Journ. Hebdom.*, tom. vii. p. 131).

I have myself, on several occasions, noticed the same thing in the discharge from abscesses, opening near the anus, and once since the occurrence of the above case, in a gunshot wound of the back, in which the ball was traced through the sacro-iliac symphysis; although in neither was there any reason to suppose that lesion of the rectum or colon existed.

2. The danger of cutting for the ball in the gluteal region in case of such a wound. In addition to the well-known danger of wounding the gluteal artery, which lies so deep, and the hemorrhage from which is so difficult to control, we have the liability of the ball to fall back again into the cavity of the pelvis.

The latter is the more difficult of the two to guard against, for while anatomy gives us the position of the vessels, which in this locality seldom varies, we must determine the depth and exact situation of the ball by the touch.

It would appear always best, in such a case, to wait until the ball ulcerates for itself a passage nearer the surface, keeping the patient in a position favourable to that process, and to avoid the danger of its falling back; or, at least, to wait until the urgency of the symptoms caused by its irritation should demand the incision; and during the operation all care should be taken to avoid so serious an accident.

3. The danger of probing within the cavity of the pelvis. The active cystitis and peritonitis immediately following the operation were undoubtedly due to this cause, although in this case it was certainly justifiable, the ball having been discovered, and within reach of forceps. The indication then was to remove it if possible, for, being movable in the cavity of the pelvis, it would undoubtedly have caused more irritation by its shifting about than a very considerable amount of probing would. The fact of its escaping during the following night could not of course be foreseen.

4. The slight symptoms following so serious an injury of bone. The ball passed through the pubes, flattening its point, and drawing the lead out over the concave surface of the posterior end, until that was more than half an inch deep; the spine of the ischium was knocked off, and a portion of the sacrum roughened. Yet there were no symptoms beyond the irritation of the bowels to indicate more than a flesh wound, until the irritation caused by the lodgment of the ball began to affect the general system.

Up to that time the pulse had been good, the spirits excellent, and the appetite fair, with no constitutional disturbance.

STANTON U. S. A. GEN'L HOSPITAL, D. C., August 9, 1865.

ART. XV.—*Case of Extensive Fracture of the Pubic Bones, with Laceration of the Bladder.* By JOHN W. LODGE, M. D., Surgeon to the Philadelphia Hospital. (With a wood-cut.)

EXCEPTING similar injuries of the skull and spinal column, fractures of the pelvic bones are the most dangerous and fatal. This depends upon the facts, that great force is usually required to heal these bones, and the proximity of important and vital organs.

The records of surgery contain many reported instances of fractures of the pubes and ilium, but none, so far as I know, from a somewhat extensive research, as peculiar and interesting as the one herein described.

The instance nearest corresponding is that published by Dr. Clark in the *Boston Medical and Surgical Journal*, vol. liii. p. 185. In that case there were three fractures, all involving the right innominate bone—one through the horizontal ramus of the pubes near the symphysis, one through the junction of the pubes and ilium, and another through the ramus of the ischium anterior to the tuberosity; the bladder was ruptured, and the patient lived twenty-six days.

Cappelletti, quoted by Hamilton, relates the case of a man, aged fifty-four years, who was thrown from a carriage and detached a portion of the ramus of the pubes and ischium by muscular contraction.

Dr. Gross (*System of Surgery*, vol. ii. p. 127) gives an illustration of a specimen from the cabinet of Dr. Neill, which corresponds at two points of fracture to the present instance. Besides the numerous fractures and extensive injury to the soft tissues, the following case has some points of interest which make it worthy of notice.

E. H. Gapwalls, private, 186th Regiment Penn. Vols., a healthy, robust man, aged about twenty-three years, on duty at the Schuylkill Arsenal, was severely injured on the 8th of April, 1865, by a mass of sand caving in upon him while at work in a quarry. After some difficulty, the soldiers succeeded in extricating him. The sand had buried him about as high as the axilla, having thrown him forward in a leaning position; the sand, from the force of the slide, being pressed very compactly around him.

He complained of extreme pain about the lower pelvic region and down the thighs immediately after the accident, and during the efforts made to relieve him.

I saw him about two hours after the occurrence, and found considerable prostration; pulse 100; examined the spine carefully, and found no tenderness in any portion of its extent, although upon either side of the lumbar vertebræ the pain upon pressure was intense, extending down either groin to the perineum, the slightest movement of any part of the body greatly aggravating it.

The body was carefully examined in search of some external injury, but none discovered; not the slightest cut or contusion existed. A little

stimulus was given, and the man transferred to the U. S. A. General Hospital, South Street.

April 9. Suffering great pain in the lower part of the abdomen and along the groins; pulse 98, regular; no fever. Complains of fulness of the bladder and continuous desire to pass urine, none having been passed since before the accident, now nearly twenty-four hours. On introducing the catheter, the instrument passed very readily, apparently to the membranous portion of the urethra; it then turned abruptly to the right side, from which place about four ounces of blood passed through it. The escape of blood gave no relief; the intense desire still remained. The perineum had begun to swell, and symptoms of urinary infiltration were being developed. Upon the right side, bounded by the raphé in the centre, the scrotum in front, and the anus behind, the swelling was making rapid progress, and had begun to extend along the inside of the right thigh. A grain of morphia was given, and fomentations of hot laudanum were applied to the abdomen.

Afternoon. The swelling about the perineum and thigh had continued; stomach excessively irritable; has passed no urine; introducing the catheter as far as the membranous portion, a few drops of blood escaped. A consultation of the surgeons of the hospital, Drs. Kærper, Maury, McArthur, and Lovell, was called, and it was thought best to cut through the swelling into the bladder, as in the lithotomy operation, to turn out the clotted blood and relieve the bladder of the urine. In view of the probable difficulty in reaching the bladder through the parts so altered by disease, and as there existed some doubt as to the best course to pursue, it was decided to ask the opinion of Dr. Gross, the distinguished Professor of Surgery in Jefferson Med. College. Dr. Gross saw the case with us in the evening, and, after some difficulty, succeeded in getting the catheter into the bladder, and removing about eight ounces of urine and blood. Much relief followed the operation. Warm fomentations to be continued, with morphia to "allay pain and quiet nervous irritation." It was concluded not to attempt further relief by the proposed operation.

10th. Passed a sleepless night; large quantities of morphia were given to produce sleep, but it was almost immediately rejected by the irritable stomach; pulse feeble and more frequent (102). Passed the catheter with much difficulty into the bladder, and got about four ounces of urine and as much blood. Swelling of the perineum increasing, extending further upon the thighs and forward upon the scrotum. Directed the anodyne by mouth and rectum to be continued, and efforts to be made to allay the vomiting, which was now excessive and almost continuous.

11th. Slept better than during the preceding night; had occasional severe dartings of pain through the pelvis; pulse 100, and rather more feeble; skin yellow, and countenance not very good. Dr. McArthur removed, with the catheter, during the night, about ten ounces of urine and some blood. Swelling continues to increase, extending about four inches along the thigh, and has involved the whole scrotum, which is much distended, moist, and of a very dark colour, emitting a strong urinous odour. The swelling upon the thigh is hard, red, and very painful. Introduced the catheter several times during the day, and removed about ten ounces of dark diffuent blood. Continue same treatment with champagne and whatever other stimulants or nourishment he will take.

12th. Had a bad night; nausea and vomiting almost continuous. Dr. Lovell succeeded in getting the catheter into the bladder and removing

about four ounces of urine. Swelling increasing; made several incisions into the distended scrotum, through which the urine flowed in big streams; pulse 105, feeble and irregular; skin yellow; mind perfectly clear. Anodyne injections; stimulants and fomentations continued.

13th. Slept better; stomach a little more quiet; pulse 105; rather more strength; tongue coated; skin very yellow. Swelling progressing, having extended eight inches down the inner side of the thigh, upward along the right groin, and backward to the buttock; the swelling is of a dark colour, and very sensitive. Passed the catheter, but got nothing but some gory blood; the urine passing through the incisions made into the scrotum; mind clear; takes no nourishment except a little champagne.

14th. Sleepless and restless night; stomach rejects everything; pulse 108, very feeble; the swollen perineum and scrotum quite dark, and just at the junction of the two the parts are beginning to die; the inner side of the right thigh is also ready to slough; mind perfectly clear.

15th. Slept some during the night; less vomiting, a few drops of chloroform control the stomach for a short time; tongue coated and dry; refuses all stimulants; pulse 111, feeble; skin yellow. Sloughing of the scrotum has commenced, the urine oozing through the sloughing mass.

16th. Pulse 118, quick and feeble; tongue coated and very dry; mind perfectly clear; sloughing continuing in the perineum and scrotum, and has extended upon the thigh as deep as the adductor muscles. A large slough was taken from the perineum, and all the urine now passes through the large cavity. Passed the catheter in the urethra, the distal end coming out through the perineum. To continue whatever stimulants he will take, and dress the parts with disinfecting lotions. Dr. Waples, who took charge of the patient from this time, reports that he rapidly sank, the sloughing spreading so as to involve the whole perineum, the posterior half of the scrotum, and an area of eight inches upon the thigh. The sloughing of the perineum penetrated as deep as the membranous portion of the urethra, that upon the thigh through skin and fasciæ so as to expose the adductor muscles. During the progress of the case no decided symptoms of uræmia or pyæmia occurred; the mind remained almost unaffected until death. He died April 22, just two weeks after the occurrence of the accident.

A *post-mortem* examination was made about fifteen hours after death, Drs. Gross, Kœrper, Maury, McArthur, Waples, and Lovell being present. Body much emaciated and the skin very yellow. Upon opening the abdomen, the vessels of the peritoneum were found filled with blood of a very dark colour, the membrane itself being normal, except the portion covering the posterior surface of the bladder, the *recto-vesical fold*; here were traces of the previous existence of inflammation, and adhesions of some strength bound it to the bladder. No other organ of the abdominal or pelvic cavities was involved in the accident.

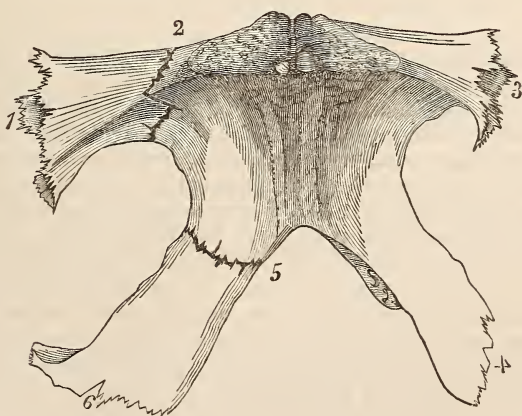
The right thigh was enormously swollen, and infiltrated with pus and decomposed urine, one long sinus-like abscess extending along the under surface of Poupart's ligament as far as the right anterior superior spinous process of the ilium. The perineum was entirely gone, the sloughing having destroyed the most of the scrotum and all the tissues between the tuber ischii down to the prostate gland and rectum. The part of the penis under the symphysis, corresponding to the membranous portion of the urethra, was almost entirely severed, its continuity being held only by some cellular tissue and part of the compressor urethra muscle.

Fractures.—The most interesting points of the case were the numerous and remarkable fractures of the pelvic bones, six distinct and complete fractures having occurred. Of these, four were situated upon the right side of the pelvis, and two on the left. *Of the right side.*—1st. One through the horizontal ramus of the pubes, an inch from the symphysis. 2d. About an inch and a quarter externally; thus separating more than an inch of the ramus. This fragment was driven downwards and inwards, and was found in front and close up to the prostate gland, having completely divided the membranous portion of the urethra; with this exception, there was but little displacement of the fragments. 3d. One through the ascending ramus of the pubes, commencing about three-quarters of an inch below the symphysis, and passing obliquely upwards and inwards for about an inch and a half. 4th. About an inch and a quarter below the preceding, and corresponding to the primary centre of union between the ascending ramus of the ischium and descending ramus of the pubes, a long fracture, sloping obliquely backwards; there was no displacement of this fragment.

Left side.—1st. One fracture exactly corresponding to the second described upon the right side. 2d. One like the last described upon the right side, only much more obliquely broken. The side which had fewest fractures had them exactly represented on the other. Excepting the lower fracture on the right side, none involved other than the pelvic bones.

Another fracture on the right side must be mentioned—a scale of the compact structure of the posterior surface of the body of the pubes, two inches long, and apparently continuous with the first fracture described upon the right side; this fragment was lost.

The accompanying figure, made by Mr. Stœffer, is an admirable representation of the connected fragments.



Remarks.—It is difficult to understand how such fractures thus described could have been produced by the kind of force applied. So far as could be ascertained, he was struck with nothing but the sand, in which I could find no other body which could have injured him, nor any near object against

which he might have been thrown. As already mentioned, no external injury existed, which would have been almost certain to occur if the force had been concentrated. "The causes of fractures of the pelvis, as might be expected, are always of a violent kind, such as falls from a great height, or some heavy weight passing over them. The pubic bones, however, *are most frequently fractured by a crushing kind of force, or by one that acts against the whole pelvis.*" (Lonsdale.)

Another curious feature of the case is the symmetry of the fractures, even the splinters of which are strangely alike. This might imply that the bones were not entirely healthy, but no evidence of disease could be found; nothing that could possibly be mistaken for syphilis or other specific disease. Still, we cannot be positive that no disease existed, knowing how marvelously refined are the affinities of the formative processes; corresponding parts on opposite sides of the body being so wonderfully alike in their nutrition, that what affects one may affect the other with exact resemblance. Chemistry may not be able to detect this refinement of the nutritive events, but a morbid material in the blood or an injury may.

PHILADELPHIA, June 18, 1865.

ART. XVI.—*Case of Premature Delivery, accompanied by Unusual Circumstances.* By T. C. WALLACE, M. D., of Shushan, Washington Co., N. Y.

ON the 20th ult., about 2 o'clock P. M., I was called to visit Mrs. L., æt. 30. I found her suffering from violent and incessant vomiting, with severe cramps in the back and lower extremities. She had suffered thus since the previous evening. She considered herself about eight months advanced in pregnancy, although she said it was difficult for her to reckon her time correctly, as she always menstruated throughout her pregnancies. She has borne three children, and her catamenia have been as regular and as abundant when she has been pregnant as at other times. Her mother, who has given birth to five children, informed me that she also has always been regularly "unwell" whilst *enceinte*. About eight months previously, Mrs. L. had been troubled for a few mornings with nausea and slight vomiting, from which she inferred she was pregnant, and had computed her time accordingly. She has had uniformly good health from that time until her present illness. I prescribed for her ten grains of oxide of zinc with five grains of subnitrate of bismuth, to be repeated every half hour, if necessary, and applied to the epigastrium a flannel cloth soaked in a mixture of chloroform one part, olive oil four parts. Her vomiting ceased soon after taking the second powder, and I left her quiet and comfortable.

Early the same evening I was again summoned, and, on my arrival, was informed that a few moments previously there had been a slight gush of "waters," and that there was at present a small flow of blood. A vaginal

examination showed the os uteri partially dilated, dilatable, and the parts cool and in the most favourable condition. The development of the womb indicated about four months' advancement, instead of eight. Mrs. L., however, was firm in the belief that she was eight months pregnant. There was not, nor had there been, the least pain. Some two hours now elapsed, during which time she was either walking about her parlour or sitting in a rocking-chair, entirely free from pain, in excellent spirits, and engaged in cheerful conversation, when she retired to an adjoining room to make water, and on rising from the night-vase she felt something against her person, and called me, saying "something was wrong." On examining her, I found the extremities and lower half of the child already "in the world;" it had evidently been born some little time, as it was cold and dry. She had experienced no pain, had not even felt any sensation of bearing down, and knew not that anything had passed from her until she felt something against her person as she was rising up. After the lapse of about an hour, whilst I had the protruded parts in my hand, the whole of the rest of the child was expelled, with no traction on my part, and without any pain on the part of the mother; in fact, she was not aware that the child was expelled until I informed her of the fact some little time afterwards. It proved to be a fœtus of only about four months, and not of eight months, as the mother had supposed. Shortly after the passage of the child, the placenta was discovered lying loosely in the vagina, and removed. There was no hemorrhage afterwards (save the usual amount of lochia), no after-pains, and in a very few days she was about the house and in her usual good health.

The above case, I think, presents points of sufficient interest to justify me in presenting it to the readers of this Journal.

In the first place, it is very rare that women are perfectly "regular," both as to time and quantity, throughout the whole period of gestation, as has always been the case with both Mrs. L. and her mother.

Secondly. It shows that in some rare cases the uterus and vagina possess sufficient contracting power to rid themselves of their contents without the aid of the diaphragm and abdominal muscles, as throughout the whole labour (I use this term, although in this case it is evidently a misnomer) Mrs. L. made no bearing-down effort whatever; and as the head and upper portion of the child were wholly expelled from the vagina, it must have been done solely by the contraction of the vagina itself, as the contraction of the uterus could, of course, have no effect on its expulsion after it had left the cavity of the uterus.

Thirdly. Another remarkable feature of the case is the entire absence of all pain. From the time when the vomiting and cramps ceased (some five hours previously to the labour), Mrs. L. had absolutely no pain whatever. Nor was this due to any unconsciousness on her part, nor to the exhibition of narcotics, as she had no medicine whatever (save as mentioned above for her vomiting), and during the whole time she was in full possession of all her mental faculties, in good spirits, and cheerful. To use her own expression, she "never felt better in her life." It also shows how little dependence can be placed in the sensations of the mother as to the motions

of the child. She insisted that she had felt a great deal of motion for at least three months, in which she was of course mistaken.

I was greatly afraid that uterine hemorrhage would follow her delivery, as it seemed to me that there was not sufficient contraction of the uterus to prevent it, as I had never witnessed a case of painless labour before; but I was most agreeably disappointed, as the flow did not exceed, and in my opinion hardly equalled, what is usually observed in such cases.

The case presents many features of interest in a medico-legal point of view; but as these are sufficiently obvious, it would be useless to detail them.

SHUSHAN, N. Y., August 11, 1865.

ART. XVII.—*Case of Obstruction of the Bowels, from a twist of the Intestine at the Lower Portion of the Sigmoid Flexure of the Colon.* Reported by F. M. GUNNELL, M. D., Surg. U. S. N. (Communicated by P. J. HORWITZ, M. D., Chief of the Bureau of Medicine and Surgery, U. S. N.)

PÉRCIVAL DRAYTON, Captain U. S. Navy and Chief of the Bureau of Navigation and Detail Navy Department, aged 53 years, was a man of unusually well-developed powers of mind and body.

On Wednesday afternoon, August 2, 1865, he complained of slight griping in the belly and a tendency to diarrhœa, which, however, did not interfere with his office duties. I gave him a little paregoric and tr. zingiberi, and prescribed hyd. c. creta, pulv. Dover., and quiniæ sulph. ãã gr. v, h. s. s. to be followed by a bottle of Kissengen water, next morning. He had been long on duty in South Carolina and in the Gulf of Mexico, and in Ironclads, and some malarial influence was suspected.

At 8 P. M. he was suddenly attacked with violent pain in the belly, and Dr. Wm. P. Johnston was called to see him. Dr. J. found the belly rather full and hard, and at the seat of indicated pain, midway between the umbilicus and pubes, he noticed a globular swelling about three inches in diameter, which he at first thought to be the distended bladder, but found it tympanitic on percussion. The bladder had been recently emptied. Enemata of salt-water and of turpentine were freely used. Calomel gr. iij, opii gr. j, every three hours, was prescribed until four doses were taken; then two full doses of ol. ricini and ol. terebinth. were given, with an interval of four hours. Elixir opii ℥xx was taken occasionally between these doses. Sinapisms were applied to the entire abdomen. No benefit was obtained from these remedies.

I saw the patient, with Dr. Johnston and Surgeon J. C. Spear, U. S. N., at 2 P. M., on the 3d. The abdomen was then greatly distended and tympanitic, and the swelling previously noticed in the hypogastric region had increased, and extended along the median line to the epigastrium. The pain was constant below the umbilicus, and very severe. Pulse 80, soft and regular.

Mechanical obstruction of the bowels was diagnosed, and invagination was suspected, although no nausea existed.

The repeated enemata returning without any sign of fecal matter, it was determined to introduce the O'Beirne tube. Dr. James Hall was called in consultation, and the tube passed on the morning of Friday, the 4th. It passed with difficulty to the sigmoid flexure, and a salt-water enema was thrown up with a force-pump, but it returned immediately unchanged; not more than a pint could be thrown in at once. Obstruction in the colon, and probably in the sigmoid flexure, was determined, and the case was regarded as hopeless. The oppression from the distended abdomen was now extreme.

Friday P. M., the patient was placed in a warm bath, and a protracted effort was made to pass up the tube, and to overcome the obstruction by throwing up water, but without success. The insufflation of air was proposed, but it was regarded as useless to employ it.

During the day he took large doses of *ol. ricini*, once with *ol. tigllii*, at his earnest request. He had several hypodermic injections of morphia, gr. $\frac{1}{6}$ — $\frac{1}{4}$, with the effect of procuring some abatement of pain.

After the warm bath, his pulse, which had been increasing in frequency and diminishing in tone during the day, was 130, and it continued to become more feeble till his death. The respiration was hurried, with frequent sighing efforts to draw a deeper breath. There was no indication of inflammation in tongue or pulse, or any nausea. No food was taken during the attack. A little tea was occasionally swallowed, and on Friday small quantities of brandy were administered.

His mind was undisturbed, and he transacted some legal business in the afternoon. He bore the terrible suffering and accepted his desperate situation with the noble, patient courage which characterized him, asking only from time to time for a repetition of the morphia to control the pain in the abdomen, the principal seat of which he always located at the original point below the umbilicus.

During the evening the oppression increased, and the compression of the stomach and pectoral viscera, so that but a spoonful of fluid could be taken into the stomach at a time, a larger quantity regurgitating into the mouth; and the respiration was accomplished with difficulty.

At 10.15 P. M. he conversed with a clergyman who visited him, and after his departure he talked to me with effort for a few moments of that

visit; his voice failed and choked while he was speaking, and at 10.45 P. M. he calmly expired.

Post-mortem, at 7.45 A. M., August 5. Rigor mortis established. Abdomen only examined. There was enormous distension of the abdomen; on opening which, the sigmoid flexure of the colon started out from a little to the right side of the median line, presenting a purple mass, pear-shaped, fourteen inches long by five inches broad at the fundus, and extending from near the pubes to the sternum. The obstruction was found at the lower portion of the sigmoid flexure, ten or twelve inches from the anus, where the bowel was twisted upon itself, and tied up by the mesentery of the ileum. This first was at the point midway between the umbilicus and pubes, which the patient had always indicated as the seat of pain.

On carrying the fundus of the pear-shaped mass, with a sweep, completely round to the left side, over the pelvis, and bringing it back to its position, the obstruction was removed and the flatus escaped into the rectum. It would seem that a small knuckle of the colon became twisted upon itself, carrying with it a portion of the mesentery of the ileum, from some undiscovered cause (a friend suggests that riding a hard trotting horse, which he had recently purchased, may have induced it), and that it became rapidly distended with flatus until it acquired the dimensions above given.

The ascending and transverse colon were distended with flatus, but otherwise in a natural condition. Inflammation had set up in the sigmoid flexure; the jejunum was natural, the ileum congested; the small intestines were flattened by pressure. The stomach was empty, and pushed up against the spine behind the left nipple. The liver was forced back on the right side till its edge looked upwards, behind the right nipple.

The immediate cause of death was the compression of the heart and lungs by the distended colon.

All efforts to relieve such a condition were necessarily unavailing. Could the exact relation of parts have been determined on Thursday morning, when the globular swelling at the seat of pain was noticed, it would have been possible to relieve the patient by opening the abdomen at the median line, and replacing the erring knuckle of the colon. In a similar case, it seems to me, such interference would be justifiable.

It is an interesting fact that the constriction in the case of Attorney General Legare, who died of the same accident at Boston, in June, 1843, was at the same point.

Dr. Hall, the consulting physician in the present case, and Dr. Thomas Miller, had twice relieved Mr. Legare in Washington, by the O'Beirne tube, before his fatal attack.

WASHINGTON, August 30, 1865.

ART. XVIII.—*Physiological Observations and Experiments, connected with Food, Pulse, Respiration, Urine, Feces, and Saliva; made by and on thirteen Medical Gentlemen of the Biological Society of Charity Hospital Medical College, during a period of sixteen consecutive days, from December 7 to December 23, 1864; with Explanations and Remarks.* By J. H. SALISBURY, M. D.

THE Biological Society of Charity Hospital Medical College was organized about the 1st of December, 1864. The objects in view were physiological observations and experiments. Before the observations were commenced, each one to be experimented upon was carefully examined, that the value of the labours might not be impaired by being made upon persons labouring under either functional or organic disease. The secretions and excretions were examined, and the height and weight of body and circumference of chest of each experimenter (deprived of clothing) accurately noted.

A room was fitted up with balances, hydrometers, graduated glasses and jars, and all other materials necessary, that all the observations and experiments might be made with the same apparatus and in the same manner. All entered upon the work with commendable zeal, and each endeavoured to excel in accuracy and detail.

The Society is much indebted to its worthy secretary, Dr. M. W. House, for the preparation of apparatus, and the laborious duties of keeping and transcribing the records, and for the completeness of many of the observations.

The following is a brief of some of the early labours of the Society:—

Observations and experiments made by J. H. Salisbury, M. D., on himself.—Age, 37. Net weight, 142½ lbs. Net height, 5 feet 9 inches. Circumference of chest, 36 inches. Hair dark brown. No organic or functional disease. In perfect health. Have had two attacks of inflammatory rheumatism, one in 1845 and the other in 1859, both from severe exposure; neither left any abnormal conditions. Had an attack of inflammation of the right lung in 1857. Recovery perfect.

Amount of saliva secreted in twenty-four hours, Dec. 13, 1864.—1. In perfect health. No abnormal condition of any organ.

2. Salivary glands normal. Neither chew tobacco nor smoke.

3. Deeming the recorded experiments quite defective—on account of the very imperfect modes of procedure to arrive at results—the following experiment was made upon himself: Immediately on rising, all the saliva secreted was placed in a graduated jar. Ten minutes before eating breakfast, began to chew paraffine to unload the salivary glands. The saliva, as

fast as secreted, was discharged into a graduated jar. After chewing fifteen minutes, drank six ounces of rich oyster soup made with milk.

4. Chewed paraffine 10 minutes, saving saliva.
5. Drank six ounces of oyster soup.
6. Chewed paraffine 10 minutes, saving saliva.
7. Drank six ounces of oyster soup.
8. Chewed paraffine 10 minutes, saving saliva.
9. Drank six ounces of oyster soup.
10. Chewed paraffine 10 minutes, saving saliva.

The saliva from the time of rising to ten minutes after breakfast measured eight ounces.

11. Placed a wide-mouthed bottle in pocket, and during the interval from breakfast to dinner refrained from swallowing any saliva. Amount discharged from breakfast to dinner, $2\frac{1}{2}$ ounces.

12. At dinner proceeded same as at breakfast. Drank 24 ounces of oyster soup in all, and chewed paraffine 50 minutes. Saliva secreted, eight and a half ounces.

13. Saliva secreted in interval from dinner to supper, two ounces.

14. Proceeded at supper same as at breakfast and dinner, drinking same amount of soup in same way. Chewed paraffine 50 minutes. Saliva secreted, ten ounces.

15. Saliva secreted from supper to 11 P. M. (time of retiring), three ounces. During the night slept without waking. No saliva secreted.

This experiment gives the following summary of results :—

- a. Saliva secreted from time of rising to 10 minutes after breakfast, Zviii .
- b. Saliva secreted during interval from breakfast to dinner, Ziiss .
- c. Saliva secreted during dinner, Zviiiiss .
- d. Saliva secreted during interval from dinner to supper, Zii .
- e. Saliva secreted during supper, Zx .
- f. Saliva secreted during interval from supper to retiring, Ziii .
- g. Total saliva secreted during 24 hours, Zxxxiv .

Specific gravity of saliva, 1.005. This result is deemed a close approximation to the normal amount secreted in 24 hours.

The chewing of paraffine was continued 50 minutes at each meal, which is a longer time than is required for eating usually. This was done, as saliva is not secreted as rapidly in chewing a tasteless substance, like paraffine, as when masticating savory food.

Amount of saliva secreted during the three meals, Zxxviss .

Amount of saliva secreted during the intervals, Zviiss .

This experiment was not repeated, for want of time.

The tables, containing the detailed observations and occupying thirty-three pages, are omitted, the means only being given.

	MEAN. Dr. Salisbury's observations.	MEAN. Dr. House's observations.	MEAN. Dr. Miller's observations.	MEAN. Dr. Cory's observations.	MEAN. Dr. Patterson's observations.	MEAN. Dr. Lewis's observations.	MEAN. Dr. Baldwin's observations.
Hour of retiring	11 4 $\frac{1}{2}$ '	10 57 $\frac{1}{2}$ '	10	9 12'	10 23'	10 59'	10 15'
Hour of rising	7 59 $\frac{1}{3}$ '	7 42'	6 6'	6 48'	6 54'	6 49'	6 30'
Pulse on retiring (sitting)	74 $\frac{2}{3}$	73 $\frac{2}{3}$	72 $\frac{1}{2}$	72 $\frac{2}{3}$	72 $\frac{1}{2}$	58 $\frac{4}{9}$	75 $\frac{1}{4}$
Pulse on rising (sitting)	71 $\frac{1}{2}$	73 $\frac{2}{3}$	64 $\frac{2}{3}$	70 $\frac{2}{3}$	78 $\frac{2}{3}$	68 $\frac{16}{100}$	76 $\frac{2}{3}$
Respiration on retiring	14 $\frac{2}{3}$	16 $\frac{2}{3}$	15 $\frac{1}{6}$	19 $\frac{2}{3}$	18 $\frac{1}{6}$	12 $\frac{1}{8}$	21 $\frac{1}{6}$
Respiration on rising	15 $\frac{1}{3}$	17 $\frac{2}{3}$	13 $\frac{1}{2}$	9 $\frac{7}{100}$	17 $\frac{1}{4}$	12 $\frac{1}{8}$	18 $\frac{1}{2}$
Hour of breakfast	8 7 $\frac{1}{3}$ '	7 56'	7 38'				
Hour of dinner	1 P. M.	1 33' P. M.	12 41'				
Hour of supper	6 P. M.	5 33'	5 38'				
Amount of water drank	22 $\frac{3}{4}$ ozs.	.....	21 $\frac{5}{8}$ ozs.	16 $\frac{1}{2}$ ozs.	30 ozs.	18 $\frac{1}{6}$ ozs.	12 $\frac{1}{8}$ ozs.
Amount of tea drank . . . . .	.....	8 $\frac{1}{4}$ ozs.	.....	$\frac{1}{2}$ oz.	.....	.....	3 $\frac{1}{2}$ ozs.
Amount of coffee drank . . . . .	.....	13 $\frac{2}{3}$ ozs.	.....	16 $\frac{1}{2}$ ozs.	30 ozs.	18 $\frac{1}{6}$ ozs.	15 $\frac{1}{8}$ ozs.
Mean daily amount of all liquids	22 $\frac{3}{4}$ ozs.	23 $\frac{1}{2}$ ozs.	21 $\frac{5}{8}$ ozs.	16 $\frac{1}{2}$ ozs.	.....	.....	3 $\frac{1}{2}$ ozs.
Number of passages of urine	4 $\frac{2}{3}$	6 $\frac{1}{2}$	3 $\frac{2}{3}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	3 $\frac{2}{3}$	5 $\frac{1}{4}$
Quantity of urine	31 $\frac{3}{4}$ ozs.	32 $\frac{1}{4}$ ozs.	27 $\frac{2}{3}$ ozs.	20 $\frac{1}{2}$ ozs.	28 $\frac{1}{2}$ ozs.	25 $\frac{1}{3}$ ozs.	25 $\frac{5}{8}$ ozs.
Highest specific gravity of urine	1.035	1.036	1.036	1.038	1.033	1.030	1.028
Lowest specific gravity of urine	1.017	1.002	1.018	1.025	1.012	1.023	1.015
Mean specific gravity of urine	1.02765	.....	.....	1.0289	1.0281	.....	1.02325
Number of stools daily	1	1	2 $\frac{2}{3}$	5 $\frac{5}{6}$	1 $\frac{1}{2}$	1	1
Weight of stools	6 $\frac{5}{100}$ ozs.	8 $\frac{1}{2}$ ozs.	7 $\frac{2}{100}$ ozs.	5 $\frac{5}{6}$ ozs.	2 $\frac{1}{2}$ ozs.	3 $\frac{5}{100}$ ozs.	5 $\frac{1}{2}$ ozs.
Age	37	45	29	30	24	24	
Weight (net)	142 $\frac{1}{2}$	168 lbs.	153 lbs.	192 $\frac{1}{2}$ lbs.	136 lbs.	148 $\frac{1}{2}$ lbs.	
Height (net)	5 ft. 9 in.	5 ft. 7 in.	5 ft. 9 in.	5 ft. 11 $\frac{1}{2}$ in.	5 ft. 7 in.	5 ft. 7 $\frac{1}{2}$ in.	
Circumference of chest	36 in.	40 in.	38 in.	39 $\frac{1}{2}$ in.	36 $\frac{1}{2}$ in.	36 $\frac{1}{2}$ in.	
Disease	none	none	none	none	none	none	

	MEAN. Dr. Woodbridge's observations. ¹	MEAN. Dr. Megg's observations.	MEAN. Dr. Benbow's observations.	MEAN. Dr. Henderson's observations.	MEAN. Dr. Merrick's observations.	MEAN of the 12 series of observations.
Hour of retiring	10 59 $\frac{1}{2}$	9 50 $\frac{1}{4}$	11 37'	12 6'	10 21 $\frac{1}{2}$ '	10 37'
Hour of rising	6 22 $\frac{1}{2}$	7 7 $\frac{1}{4}$	7 10'	7 11'	7 6'	7
Pulse on retiring (sitting)	83 $\frac{1}{2}$	70 $\frac{3}{4}$	72 $\frac{1}{2}$	61 $\frac{3}{4}$	91	73 $\frac{5}{8}$
Pulse on rising (sitting)	81 $\frac{1}{4}$	81 $\frac{1}{10}$	66 $\frac{3}{4}$	60 $\frac{1}{4}$	85 $\frac{5}{8}$	73 $\frac{1}{2}$
Respiration on retiring	20 $\frac{1}{4}$	16 $\frac{1}{2}$	15 $\frac{2}{3}$	16 $\frac{6}{8}$	14 $\frac{2}{3}$	16 $\frac{2}{3}$
Respiration on rising	19 $\frac{2}{8}$	15 $\frac{1}{2}$	14 $\frac{3}{4}$	16 $\frac{6}{8}$	15 $\frac{2}{4}$	17 $\frac{3}{4}$
Hour of breakfast						
Hour of dinner						
Hour of supper						
Amount of water drank	56 $\frac{3}{8}$ oz.	22 ozs.	28 ozs.	29 $\frac{1}{2}$ ozs.	17 $\frac{1}{2}$ ozs.	25 $\frac{1}{2}$ ozs.
Amount of tea drank . . . . .	.....	.....	$\frac{1}{16}$ oz. wine	.....	1 $\frac{1}{2}$ ozs.	
Amount of coffee drank . . . . .	.....	.....	28 $\frac{1}{16}$ ozs.	.....	18 $\frac{9}{10}$ ozs.	25 $\frac{1}{2}$ ozs.
Amount of all liquids drank	56 $\frac{3}{8}$ ozs.	22 ozs.	2 $\frac{1}{4}$	5 $\frac{3}{4}$	3 $\frac{1}{10}$	4.57
Number of passages of urine daily	7 $\frac{1}{2}$	4	.....	.....	.....	6.287 ozs.
Mean amount of urine at each passage . . . . .	.....	.....	.....	.....	.....	28.73 ozs.
Quantity of urine	46 $\frac{1}{4}$ ozs.	24 $\frac{1}{4}$ ozs.	28 $\frac{1}{4}$ ozs.	27 ozs.	27 $\frac{1}{4}$ ozs.	
Highest specific gravity of urine	1.030	1.030	1.028	1.029	1.032	
Lowest specific gravity of urine	1.024	1.030	1.024	1.022	1.020	
Mean specific gravity of urine	1.0275	1.030	1.0269	1.02725	1.0288	1.02756
Number of stools daily	2 $\frac{3}{4}$	1	1	1	1	0.952
Weight of stools daily	6 $\frac{2}{8}$ ozs.	3 $\frac{1}{2}$ ozs.	6 $\frac{1}{16}$ ozs.	5 $\frac{1}{16}$ ozs.	6 $\frac{5}{16}$ ozs.	5.73 ozs.
Age	23	30	26	51	34	
Weight (net)	151 lbs.	130 $\frac{1}{2}$ lbs.	123 $\frac{1}{2}$ lbs.	137 lbs.	137 $\frac{1}{4}$ lbs.	
Height (net)	5 ft. 7 $\frac{5}{8}$ in.	5 ft. 6 $\frac{3}{4}$ in.	5 ft. 6 $\frac{1}{2}$ in.	5 ft. 8 $\frac{1}{4}$ in.	5 ft. 8 $\frac{3}{8}$ in.	
Circumference of chest	36 $\frac{1}{2}$ in.	33 in.	33 in.	35 $\frac{1}{2}$ in.	35 in.	
Disease	chronic diarrhoea and diuresis	none	none	none	oxaluria	

¹ This experimenter is labouring under chronic diarrhoea and chronic diuresis, contracted in the army. He drinks and voids a large amount of fluids.

² Mean, throwing out Dr. Woodbridge's observations, which are made on a person labouring under chronic diarrhoea, &c.

Remarks.—The mean of the sitting pulse on retiring—calculated from 159 individual observations, made on 12 different persons in health—is $73\frac{5}{42}$.

The mean of the sitting pulse on rising—calculated from 157 individual observations, made on 12 different persons in health—is $73\frac{9}{42}$.

The mean of the sitting respiration, per minute, on retiring—calculated from 158 individual observations, made on 12 different persons in health—is $16\frac{3}{21}$.

The mean of same pulse on rising—calculated from same number of observations—is $17\frac{3}{42}$.

The mean daily amount of fluids (mostly water) drank by the 12 experimenters, during 16 days, was 25.2 ounces.

The mean amount of urine voided daily by same parties was 28.73 ounces. The mean number of passages of urine daily was 4.57. The mean amount voided at each passage, 6.287 ounces. The mean specific gravity of the urine, 1.02756. The mean number of stools daily—calculated from over 100 individual observations—0.95. The mean weight of each stool—calculated from the entire series of observations—5.73 ounces.

The foregoing observations have been made with great care, and have been a work of labour. We trust they may fill a partial vacancy in physiological observations in this direction.

ART. XIX.—*Aneurism of the Brachial Artery, occurring after Amputation. Rupture of the Tumour, with Hemorrhage; Reamputation; Recovery.* By G. W. SMITH, M. D., of Plainfield, Pa.

JOHN FINLEY, private, Co. E, 3d Massachusetts Artillery. Admitted to White Hall Hospital, Aug. 24th, 1865. This man's right arm had been amputated, Aug. 19th, very close to the elbow-joint, in consequence of a severe injury of the right forearm, the result of the premature explosion of a shell fired from his own gun. The form of the operation was the anterior and posterior flap. On admission, the man's general health was *very* much better than could have been expected under existing circumstances; he ate well, slept well, and suffered but little pain; his bowels were regular, tongue clean, skin healthy, pulse 78 and of good volume. These happy indications are severally alluded to, because it is thought their existence is somewhat remarkable in conjunction with a stump five days after amputation, the condition of which is decidedly unhealthy, not only at the point of operation, where the flaps are pale, flabby, and by their appearance would seem to indicate a decided lack of constitutional vitality, but throughout its whole extent, being severely and deeply burned. The left arm, shoulder, and breast were also badly burned. The treatment consisted of nutritious food, and porter, with a local application of warm water; as a stimulant, an occasional touching of the wound with acid. nitric. $\mathfrak{z}\text{j}$ to aq. $\mathfrak{z}\text{j}$ was resorted to.

On the night of Aug. 27th secondary hemorrhage occurred, of an alarm-No. C.—Oct. 1865.

ing character ; the bleeding was finally arrested by pressure, after at least twenty-five ounces of blood had been lost. From this time until Aug. 31st the patient did comparatively well ; on the morning of this day the hemorrhage recurred, and a board of medical officers was called to see the patient in consultation. At this time the burned arm was in a very unpromising condition, for though not actually sloughing, there was every indication that such an event would soon occur. It was also discovered that the circulation in the part, from some cause, was abnormal. After careful examination, an opinion was formed that an aneurism of the brachial artery existed. The unhealthy condition of the burned stump, it was thought, promised badly for the success of ligation, and it was decided to reamputate. The circular operation was performed near the shoulder-joint. Very little hemorrhage occurred. Anæsthetic used, chloroform one pint, ether four pints.

An examination of the removed part showed a well-formed aneurism of the brachial artery, existing about two and a half inches above the point of the application of the ligature. The two *inner* coats of the artery were *intact*, and *formed the walls of the aneurismal tumour*. The external coat was deficient, a small portion of its circumference having been shaved off by the knife of the operator in cutting the anterior flap at the first amputation. Through this opening, or ring, the aneurismal tumour protruded, reminding one of the protrusion of a femoral hernia through its ring. The edges of the *ring* were bold and well defined, and the tumour itself consisted of a well-marked neck and body ; that portion of it within the circumference of the ring being constricted to the diameter of one-eighth of an inch, the protruded part, or body, measuring at least half an inch in diameter. It was discovered that the hemorrhage proceeded from a rupture in the walls of the aneurism.

The secondary amputation did very well, and the patient was transferred to his own State, Oct. 29th, with a stump entirely cicatrized.

In this case there are two points of interest presented to the surgeon. The first is, that the knife of the operator, in performing the flap operation, may so wound an artery as not to be perceptible at the time, and yet give rise to very serious secondary results. Again, it proves that the walls of an aneurism are not always formed by the *external* coat of an artery ; neither are they always formed by the dilatation of all the coats, or by cellular tissue ; but may be formed by the dilatation of the *internal* tunics, the outer one being, from some cause, injured. In the case above delineated, the external coat was certainly injured by the knife. At first it was thought that it might be the result of a direct injury to the vessel at the time of the explosion of the shell ; but the healthy condition of all the coats, as well as the smooth *cut* edges of the wound in the fibrous tunic, precluded the latter supposition.

REVIEWS.

ART. XX.—*Sanitary Condition of New York City.*

1. *Annual Report of the City Inspector of the City of New York, for the year ending December 31, 1864.* Board of Aldermen. Document No. 7.
2. *Report of the Council of Hygiene and Public Health of the Citizens' Association of New York, upon the Sanitary Condition of the City.* Published, with an Introductory Statement, by order of the Council of the Citizens' Association. Appleton & Co., 1865.

OUR readers are all doubtless aware that the sanitary condition of New York city has been for many years past a *questio vexata*, the literal facts not having been made sufficiently apparent amid the hot discussions between the sanitary officials on one side, who claim that it takes rank among the healthiest cities of the world, and, on the other side, the medical profession almost unanimously, who assert it to be a hotbed of disease and death, whereas, from its topography, its location, and its artificial facilities, it ought to be far ahead of any other in point of salubrity.

The battle which has been waged so long and so vehemently appears now to have been brought to a conclusion, if we can judge by the evidence contained in the two handsome volumes before us. Not that there is the least disposition evinced by the City Inspector, in his official report, to yield the contest, and admit any error in the assertion so persistently made, that everything that can be done is done for the sanitary good of the city, but the facts and figures as to the insanitary condition of the population are so amazingly strong and abundant, and are made so glaring and plain in the other volume above mentioned, that no one who reads and compares the opposing statements can hesitate a moment as to which side presents the strongest evidence.

The mortality of New York in 1864, according to its official records, was 25,645, an increase of 449 over the previous year, and of 4,401 over 1862. This enormous mortality resulted from 200 different diseases, as reported, nearly two-thirds of them being classed as preventable under proper sanitary regulations. Among the latter were 1,425 from typhus and typhoid fevers, and 394 from smallpox and varioloid. From these and a few others of the zymotic class, more than one-half the whole mortality was derived.

The number of marriages recorded is 2,637, and of births 5,592. These figures do not embrace all that occurred under those heads, as "many of the clergy absolutely refuse to make returns, although the law requires it, and physicians do likewise." We are not informed with whom lies the duty of enforcing the law, but the legal prosecutor would appear to be equally derelict with its violators. It is estimated that not more than 33 per cent. of the marriages are reported, and that there must have been at least 32,000 children born. It would doubtless be difficult to obtain evidence upon which to prosecute physicians or midwives for neglecting to report the births, such events not being in general publicly known; but

with regard to the marriages, we presume that nine out of every ten are advertised, and the record could either be made up from the newspapers, or the neglectful clergymen or other officials easily discovered.

Of the total deaths, it is stated (p. 186) that 13,662 were males, 11,983 were females; 5,959 were men, 5,114 were women, 11,073 were children (under 20), 6,058 were children (under one year).

There is a manifest error of 3,500 in this statement, as compared with the total.

The death rate of the whole population is given as 23.7 to the 1,000 living, while that of children under one year of age was 175 to the 1,000 births, according to the *estimated* number of the latter, the actual return being, as before stated, very imperfect. "Out of 1,000 deaths of children under fifteen years of age, 435 occurred in the first year, 458 at from one to five, and 105 at from five to fifteen." * * * "It would seem, therefore, that the chief strain on a city life is during childhood, at from one to five years of age, and in manhood after the meridian of life has been passed. It also appears that in the latter case the strain comes from *occupation and from habits*, rather than from *any local circumstance about the homes of the people*; for not only is the mortality greater among men than women, but there is a large difference in the death rate of different classes." This last quotation from the London report for 1863, by Dr. Letheby, seems to be confirmed by the statistics of death in New York.

A vast labour has been expended in the preparation of the tables of this report, putting the returns in almost every imaginable shape, with such a degree of minute detail as almost wearies in a superficial inspection.

There are some curiosities discoverable here and there, a few of which we notice. Thus, among the deaths by *cholera infantum*, we find tabled, on page 297, *four men and one woman*, of ages between 20 and 50.

Again reversing the natural order, we find recorded, on page 315, ninety-one deaths of *children by puerperal fever*. This last item shows the absurdity of making the 20th year the dividing line between childhood and adult age, for though the deaths alluded to occurred under 20, they must have been of mothers, if not wives. In our judgment, the year of division should not be above 15, especially with females, as at that age, with rare exceptions, that sex are capable of having children of their own, and should not even technically be classed as such. Even the male sex after that age rapidly assumes the attributes of manhood.

But the most remarkable feature of the volume, regarding it as a report from a public department upon whose shoulders lies in a great degree the heavy responsibility of the health and lives of the immense population of New York, is its tone of *apology* for the great mortality, and the frequent studied effort to conceal from public view the connection between the diseases and their causes, amounting indeed to a denial of the influence of vicious circumstances in the production of fevers and other malignant disorders, whence come a great proportion of the deaths.

Coupled with this, we observe also a manifest desire to depreciate the comparative healthfulness of other large cities, and by this means, instead of by actual facts and figures, to appreciate the salubrity of New York; the great merit claimed for it is, that it is *healthy by comparison*, and not by virtue of *actual salubrity*, as shown by a *diminished mortality*. Without claiming to understand fully the extent of the health powers devolved upon the office of *City Inspector*, or the closeness of its connection with the Board of Health, or other sanitary authorities of New York,

we should judge, from the general contents of the volume before us, that to this department of the city government are intrusted the general supervision and control of all matters pertaining to the public health; and yet, if this be so, we are surprised to find so little reference to the real practical duties usually intrusted to such departments. Not only is there no allusion to measures of sanitary reform undertaken or accomplished by the bureau (except the removal of street dirt and garbage), but we find several deprecatory allusions to the humane efforts of others to this end, and on page 232 the following admission of inability to present the true sanitary condition of the city. In the midst of a mass of tables occupying nearly 150 pages, we are told that "by reviewing these daily, weekly, and monthly statements, you can at once perceive not only the year, but the season, and even the days, when the greatest as well as the least amount of sickness prevailed. Should any one, after examining these and other matter contained in this report, be unable to judge of the health of our city, *I am at a loss to know how to present it to their understanding.*"

This may be regarded as a virtual confession of ignorance of what constitute the real sanitary features of a city, and at once excites the suspicion that those having this high behest in hand regard the *mere recording of its mortality* as the chief end and aim of their appointment, so far as the public are concerned. The chief of the department seems disposed also to regard the voluntary efforts of disinterested citizens in a critical manner, an instance of which we will show further on.

It seems that there is a Board of Health, but that it holds no meetings, "owing to the unwillingness of his honor the Mayor to convene them," though urgently desired to do so by both the City Inspector and the Common Council. The Mayor's denial of this request is probably due to the fact that the Board of Health is by law composed solely of the members of the Common Council, an *ex-officio* board, elected *not* as a Board of Health, but merely as Aldermen and Councilmen, with no knowledge of sanitary matters whatever, without a professional expert among them, and whose action on health affairs would be likely to do as much harm as good.

How different this from the Board of Health of the city of Philadelphia, which is composed of eleven persons, specially appointed for the purpose, of whom five are physicians, and in addition there are four executive officers, at least three of whom are also physicians, besides a large corps of medical men appointed to enforce measures for preventing the spread of smallpox.

The whole number of men employed in the City Inspector's department of New York is 928, "besides the drivers of 290 ash-carts daily employed," and although, as before stated, to it are committed the sanitary interests of the city, the *only one* of this regiment of officials pretending to any professional knowledge is the Registrar of Records and Statistics.

The entire sanitary service is in the hands of cartmen, grocers, mechanics, grog-vendors, common labourers, *et id genus omne*. We cannot wonder, therefore, that the Citizens' Association is denominated by their chief "*an arrogant and self-constituted organization.*"

To account for the 449 increased mortality over the previous year, it is asserted that there was an increase of population of at least 80,000, which figures are made up as follows: "First, by birth 25,572; and 2d, "the *number required* to make up the balance would be 54,458," which is charged upon "immigration," chiefly "from the border and Southern States."

These figures are of course without any positive data, no census having been taken, and are therefore mere estimates made for a purpose, while the great fact is wholly ignored that during that and the previous three years the population had been depleted by the army to the extent of over 100,000 men, to say nothing of many hundreds of others connected with the hospitals and other military and civil operations.

In the absence of any information as to the real sanitary aspect of the city, derivable from this official report, we turn with great satisfaction to the other volume before us. This great work, great both in the sense of size and value of contents, is one of the most striking exhibitions of public spirit manifested by private citizens that has fallen to our notice. That hotbed of depravity, extravagance, and unhealthfulness, as it is denominated by many of its own people, is, by this publication, demonstrated yet to contain a leaven of righteousness in the midst of the festering mass.

"*The Citizens' Association of New York was organized for purposes of public usefulness,*" are the first words that meet our eyes on opening this volume, followed by an expression of "*deep convictions of duty and necessity.*" It is composed of a number of the most upright and wealthy citizens, who have banded themselves together for the purpose, 1st, of inquiring into the truthfulness of the very numerous charges of wrong-doing, defalcation, &c., in the various departments of the city government; and 2d, of endeavouring to arouse the attention of the citizens at large to the duty of correction. One of the first, as it is one of the most important subjects demanding their attention, was the sanitary condition of the city, and to the results of their investigations on this deeply interesting and vital topic the volume before us is dedicated.

The manner in which the material for the work was obtained, the liberality of men and means employed in prosecuting the undertaking, and the exhaustive result of the patient and devoted labour, are probably unsurpassed by any similar enterprise, either of a private or public character, known in history.

This Association having determined to make a thorough examination of the whole matter for their own information, to aid them in their efforts at civic reform, they commenced by appointing a *Council of Hygiene*, composed of many of the most able and upright medical men, to whom was intrusted the arduous and delicate service of obtaining a thorough sanitary survey and inspection of the *whole city*, a work of no trifling magnitude, when it is remembered that it has a population of about 1,000,000, and that they had no official authority to enter premises or demand answers to inquiries.

Under the direction of this "Council," of which Prof. Jos. M. Smith was President, and Elisha Harris, M. D., was Secretary, the city was divided into thirty districts, for each of which was appointed a Medical Inspector, who received a fair pecuniary compensation from the funds of the Association, and were required to make their reports at stated intervals, according to an elaborate system, embracing the following

Subjects for Sanitary Inquiry.

1. Nature of the ground.
2. Drainage and sewerage.
3. Number of houses in the square.
4. Vacant lots, and their sanitary condition.
5. Courts and alleys.

6. Rear buildings.
7. Number of tenement-houses.
8. Description of a single tenement (of a family).
9. Description of a single tenant-house.
10. Description of a row of tenements. These descriptions should state:
a. Condition of material and buildings. *b.* Number of stories and their height. *c.* Number of families intended to be accommodated, and space allotted to each. *d.* Water supply and house drainage. *e.* Location and character of water-closets. *f.* Disposal of garbage and house slops. *g.* Ventilation, external and internal. *h.* Cellars and basements, and their population. *i.* Condition of halls and passages. *j.* Frontage on street, court, alley, N., E., S., W. *k.* Miscellaneous items. *l.* Statement of sickness and mortality (according to the printed formulæ for insalubrious quarters).
11. Drinking shops, brothels, gambling saloons, &c.
12. Stores and markets.
13. Factories, schools, crowded buildings.
14. Slaughter-houses (describe particularly).
15. Bone and offal nuisances.
16. Stables, &c.
17. Churches and school edifices.
18. Prevailing character of the population.
19. Prevailing sickness and mortality.
20. Source of preventable disease and mortality.
21. Condition of streets and pavements.
22. Miscellaneous information.

The foregoing will be seen to embrace a most complete inspection of everything pertaining to the condition of the city, as every house, factory, brothel, store, &c., was to be individually seen and reported upon. But, in addition to this, there was required of the Inspectors a report of "PESTILENTIAL DISEASES AND INSALUBRIOUS QUARTERS," wherever these should be found, for which a very complete tabular record was prepared, embracing, among other things, the name of every patient found with a malignant disorder, with his residence, age, nativity, social condition, occupation, history of the case or cases, the predisposing and direct causes, &c. &c.

Smallpox and typhus fever were made special subjects of examination, and the whole number found by the Inspectors during their visits were reported weekly.

Smallpox prevailed as an epidemic during the period of this investigation, to an extent which the weekly official reports of deaths gave but a very imperfect idea of. At one time in the winter the corps of inspectors gathered up the records of 1,500 cases of variola and varioloid in the course of a few days. From this fact we may understand how it is that the city of New York has been a long time regarded as a great focus of this disease, whence it spread over the whole country.

"In April, 1864, when a member of the council was preparing plans for a voluntary survey of the sanitary condition of the city, he visited five domiciles in a single hour in which smallpox was prevailing within fifty feet of the largest dry goods jobbing houses on the continent; and he saw children, from whose faces the crusts of the pock had not yet fallen, passing back and forth through the narrow alley leading to their pestilential homes, and gathering unrestrained, and apparently unnoticed, about the entrances to the stores and offices of the vicinity; and upon inquiry at that time, the fact was ascertained that smallpox

had been constantly prevalent throughout that neighbourhood for several months; that a succession of tenants, incoming and outgoing, had kept up a fresh supply of victims to the loathsome malady."

We quote the above as a specimen of a very large number of instances in which this and other equally serious diseases are allowed to have free course, unrestrained in the slightest degree by the health authorities of that city, from which its enormous mortality and its unenviable sanitary reputation are obtained.

The manner in which these cases are treated by the *officials*, when, by *accident*, their existence is made known, and the neglect of the subject in general, are well displayed in the following passage, in a note on page lviii.

"As the expediency of publishing details upon the subject here referred to is justly questionable, it may be best to state, in general terms, that during the past few years there has been an increasing negligence of all reasonable precautions against the exposure of smallpox patients, and their garments, and all other materials, which, by contact with the sick, had become fomites of the smallpox virus. Public hacks and railway cars have been freely used by persons in all stages of smallpox: the clothing of patients, who have died of that malady, has been sold to dealers in old clothes; and the sanitary inspectors further report many instances in which they found persons sick with smallpox in the same close apartment with tailors who were working upon woollen clothing. In other instances, where the children of poor shirt-makers were sick with the disease, the new garments and the material in hand were seen used as covering and wrappers upon the patients; everywhere there appeared to be no restraint upon the intercourse with families among the tenant-house population where smallpox was prevailing; and as the result of searching inquiry into the history of more than twelve hundred cases of this dreadful disease, during the early part of the winter, 1865, the inspectors found but two instances in which the infected domiciles had been visited by any officer or employee of the health department of the city government. In one of those instances the so-called health warden stopped at the foot of the stairway, forty feet distant from the poor tenant who had the disease, and delivered his orders, as follows: 'Put pieces of camphor about the clothing of those who are not sick, and occasionally throw some camphor upon the hot stove.' In the other case, the sanitary officer of the ward called at the entrance of a tenant-house, in a densely crowded district, and instructed the poor families, whose domicile was smitten with the contagion, that they must not permit any person to know, or to mention that there was smallpox there, and that if that injunction of secrecy were not strictly obeyed he would send them all to the pest-house. Facts like these require no comment from this council. They call for indignation as well as for a renewed effort of the citizens of this metropolis to provide some means for protecting the people against such evils."

In illustration of the evil effects of this total neglect of supervision and restraint, a number of instances are given of the extension of this disease to distant places beyond the city. Thus, from Connecticut and Rhode Island, from Buffalo, distant 400 or 500 miles, and many other localities, positive evidence has been received that smallpox had been imported from New York city, either by persons who had been seized with it there, or by goods which had been purchased there, and were boxed up with the virus fresh from the room and hands of the manufacturing tenant-house occupants.

With such facts as these presented to the world, it would seem but proper, if that municipality will thus continue to spread death-dealing influences to other cities and States, and will not heed their remonstrances against such gross disregard of the health and lives of others, to place it in quarantine by refusing intercourse with it, and compelling it, by an embargo of its goods and people, to show "a clean bill of health."

Of fevers of various kinds the report states that—

“Two thousand and eighty-three persons died of fever in this city in 1863. Nine hundred and three of these deaths were caused by scarlet fever, a disease that is fearfully fatal in unventilated and crowded dwellings; eighty-three were from puerperal disease, and all the remainder, except two cases, were from typhus, typhoid, and malarial fever poisons, all of which were preventable. The nine hundred and fifty deaths from typhus and typhoid fevers that year represented, probably, more than 12,000 cases of that most preventable type of disease. During 1864, it is known that fevers were still more prevalent. During the summer and autumn the sanitary inspectors studied the local history of upwards of sixteen hundred cases of typhus.”

One of the most interesting, as well as important, questions, to be determined by such investigations as these, is the *sickness rate*; in other words, in the populations of cities, and other communities, “what is the ratio of deaths to the total number of persons sick,” meaning the sick with all diseases. It was stated by Dr. Playfair, as a result of his examinations on this subject in the city of Manchester, that the number of persons sick bore a proportion to the deaths of twenty-eight to one, in a mixed population of all ages. The general truthfulness of this statement has been verified in other instances where opportunity has offered for investigation, and the data obtained by the council of hygiene confirm it in a marked degree. As an example, it is stated—

“In the Metropolitan Police force, consisting of 2,014 men, carefully selected and peculiarly exposed, the *standard of health* during the year 1864 is thus described by the statistics of sickness and disability. The number of days lost by sickness in the force was, in the aggregate, equal to 67 years of time. This is equal to $3\frac{1}{2}$ *per cent.* of the total force. That is, $3\frac{1}{2}$ *per cent.* of the men were constantly sick (or wounded); 31 died, or 1 in 65; and the total number of cases of sickness was equal to 28 to each death, allowing an average period of illness of $16\frac{1}{2}$ days to each man on the sick list.”

An examination of the records of some of the public dispensaries, made some years since, embracing the number of persons treated for all manner of disorders, and the number of deaths, afforded an additional confirmation of the ratio of sickness to the deaths as pronounced by Dr. Playfair.

Proceeding upon this rule, which in such a city as New York is quite as likely to be more so than less among the population at large, as in more salubrious places, we find that the amount of actual sickness (an item which the public officers take no note of) in the year 1863 was as follows:—

Number of deaths 25,196, which, multiplied by 28, gives the number of persons sick as 705,488, or nearly three-quarters of the whole population. In 1864 the mortality rose to 25,645, and the number of sick to 718,060.

The ingenuity displayed in the report of the City Inspector, in the endeavour to satisfy the public that they are enjoying a rare degree of salubrity, and should be contented, and refuse to listen to those who assert the contrary, evinces a marked want of sympathy with those noble efforts for the improvement of the poorer classes in their homes, their food, the air they inhale, and the light of which they are deprived, which characterize the philanthropist and the hygienist.

As an example, we refer to the attempt to convince us that the 1,425 deaths by typhus and typhoid fevers are not properly attributable to the horribly vicious condition in which more than half the population live. The argument is made to run thus:—

“It (typhus) appears in the form of an *epidemic*, and, like all zymotic diseases, varies in malignance and duration at different periods in the same

country. The *epidemic* influence is always *intensified* by local circumstances, such as large numbers of persons closely congregated together, hence its prevalence in nearly all large armies, &c." "Its prevalence is dreaded next to small-pox, and at this time is, in reality, a much more fatal disease; there is perhaps no one more important, nor any that there exist *so many conflicting opinions* in regard to the pathology, diagnosis, and treatment of."

"It is not a very prevalent disease in this city, but few deaths, comparatively, are reported, and a large number of the cases that do occur are among recently arrived immigrants, *who import* the disease. It has, however, been more prevalent during 1864 than for many years; indeed it has prevailed, more or less, all over the States."

"It is asserted that garbage, offal, decaying vegetable matter, and unclean streets will create and originate epidemics. These and other similar agents do produce disease, sporadic or isolated cases, and they may create an endemic; but as to producing an *epidemic*, that is an utter impossibility, in the full sense of the term. * * *Who could have the effrontery (calling himself educated)* to assert that *these epidemics* are the result of neglected sanitary regulations?"

Ergo, typhus fever, even in a crowded city like New York, is an *epidemic*, and cannot result from local causes. Therefore, good citizens, be not alarmed, and take no trouble about unofficial assertions to the contrary.

Notwithstanding this attempt, in one place, to prove that typhus and typhoid fevers, and variola, which jointly caused 1,819 deaths, representing a total of about 30,000 cases, were epidemics, and therefore not attributable to local or removable causes, we find on page 187 the following assertion: "These returns indicate the city to have been *entirely free from any epidemic or even endemic*, and the general health to have been unusually good." The force of argument need no further go to prove the incorrectness of these records and statements.

Let us now compare this *official theory* with the *facts* as pictured by the Council of Hygiene of the Volunteer Citizens' Association. Speaking (p. cvi.) of—

"The fever nests that afflict our city, in the minutely detailed reports which the Sanitary Inspectors have made respecting them, there is constant and direct testimony confirming the following points: (1) That in many of the tenant-houses of the city there exists such excessive overcrowding, uncleanness, and utter want of ventilation, *that typhus is liable to occur at any time*; and when once infected with the virus of that fever, such houses will become sources of domestic pestilence, and of danger to the public health; (2) that the number of localities which are already infected with the fever poison (including both typhus and typhoid fever) in this city is believed to be not less than *five hundred*; (3) that the total number of insalubrious quarters, which are particularly *liable* to an outbreak or endemic of fever, is *not less than three thousand* houses and places; (4) and lastly, that the causes which have localized fever in five hundred different places in this city, and which threaten its outbreak in thousands of other localities in the various wards, can be removed and prevented only by thorough ventilation of the house in which the fever exists or is threatened, by cleansing and purifying, by thinning out the badly overcrowded buildings, and by the perpetual vigilance of an *intelligently directed sanitary police*."

It is stated in addition, that "the Sanitary Inspectors during the summer and autumn studied the local history of upwards of *sixteen hundred cases of typhus*, with reference to the localizing causes that existed in different places." So much for typhus fever, which the officials seem to believe is the epidemic product of general, and only aggravated by local causes, but which is thus proved to be the especial scourge of the poor, filthy, and overcrowded population, deficient in all sanitary supervision. Let the reader judge which of the above cited authorities is correct.

Diarrhœal maladies, including cholera infantum, cholera morbus, and dysentery, constitute another serious and preventable source of mortality, having last year caused 2,573 deaths, and we notice two remarkable facts: 1st, that, notwithstanding that great and costly achievement, the introduction of the Croton River, which we supposed was used by every inhabitant, there are many to whom it is yet inaccessible; and 2d, that one of the localities most prolific of these deaths was in the immediate vicinity of that splendid hygienic resort, the Central Park, as thus described:—

“Stagnant water, obstructed drainage, putrefying garbage, decomposing animal matters, putrid exhalations from various sources, deteriorated food articles, and the *use of water from wells* into which the putrid soakage of filth had percolated, are clearly proven to be the causes of the diarrhœal diseases of that district.”

The water of one of the wells in a crowded tenant neighbourhood, near the Central Park, under an analysis by Prof. Draper, yielded the following results:—

Organic matter and volatile salts, per gallon	. 10 $\frac{5}{100}$ grains.
Fixed salts { Phosphate of lime, carbonate of lime,	} 14 $\frac{15}{100}$ “
sulphate of lime, sulphate of soda,	
chloride of sodium	
Total solid residue, per gallon	24 $\frac{20}{100}$ “

“In all the numerous families that make use of the water from this well, obstinate and fatal diarrhœal maladies prevail throughout the year. Is it not plainly the duty of the health authorities to know such facts, and shall the city, through the ignorance of officials, neglect to provide Croton water for the poor?”

The above quotations are but specimens of hundreds equally striking, reported by the inspectors, of which the officials seem wholly unacquainted, and, because of this ignorance, insist that they do not exist, and that nothing is required to improve the already highly salubrious state of the city.

These facts and comparisons will suffice to demonstrate that New York city is not only the metropolis of commerce, wealth, and population, but also of insalubrity. The noble volume issued by the Citizens' Association shows that the medical profession fully comprehend the nature of the evils described, and how to relieve themselves of responsibility therefor.

The two documents under review are excellent illustrations of “how to do it” and “how not to do it.” Each is a model in its way, and any municipal government, desirous of prosecuting the work of sanitary reform, will find in the report of the Council of Hygiene an admirable guide for the purpose.

At the time the council completed its sanitary survey of the city, December, 1864, there were 501,224 persons residing in tenant-houses and cellars; the total number of tenant-houses was 15,309, and the average number of families to each was $7\frac{1}{8}$, including the poor families that take boarders, keep lodgers, &c.¹ There were 173 slaughter-houses, “too offensive to health and decency.” The report also gives the number of drinking shops, brothels, gambling places, stables, bone-boiling establishments, rear tenements, markets, factories, and many other items of sanitary and moral interest.

¹ In the number for July 1, 1865, of *Frank Leslie's Illustrated Newspaper*, may be seen an accurate representation, on a large scale, of one of the largest and most noted of the New York tenant-houses, one of the most prolific *fever nests*.

The medical practitioner may also profit largely by its perusal. As an example of the interesting results of this sanitary survey, and proving the intimate relationship of diseases with circumstances before unsuspected, we quote from the report of the 4th district (Dr. E. R. Pulling, Inspector) the following on the *Influence of Stables upon Disease* :—

“Of 44 cases of erysipelas occurring during the past year, no less than 31 were adjacent to or within twenty-five feet of stables (of which there are 47 in the district, one ward). At No. 10 — Street, which is contiguous to one of the largest stables in this district, four cases of this affection occurred. The rear of No. 27 — Street adjoins a stable, and is within 20 feet of another. In this house, which is occupied by five families, there were three cases of erysipelas. The rear of No. 22 Cherry Street, which contains sixteen families, is separated from a large stable by a vacant lot, with which runs much of the fluid part of the manure. In this house five cases of this disease were reported during the year.”

The first complete sanitary survey ever made of the city of New York has now been completed, and that by the liberality of private and independent citizens. The task has been executed by physicians. Familiar with the haunts of fever and other pestilential diseases, the Sanitary Inspectors have fearlessly penetrated the dismal and unwholesome quarters where infectious poisons menace inhabitants and visitants, whence they find their way to the more favoured districts.

The letter-press of the volume, admirable in execution, is accompanied by numerous pictorial illustrations, engraved chiefly from photographic originals, of the most celebrated *fever nests* and other insalubrious places, and *multiple domiciles*, the whole presenting a rare and most interesting *tableau vivant*. The first illustration is a coloured *sanitary and topographical map* of the whole island, nearly two yards long, prepared for the special purpose of this volume, and is itself well worth the cost of the book to all concerned in the property or welfare of the city. * * *

ART. XXI.—*Transactions of the Epidemiological Society of London*. Vol. II. Part 1. Sessions 1862–63, 1863–64. 8vo. pp. 246, with an Appendix of 48 pages. London, 1865.

THE portion of the Epidemiological Transactions before us comprises the papers and reports presented at the fourth and fifth sessions of the society. These, though in general less voluminous than those read at former sessions, are scarcely inferior in interest and practical value.

The first paper in the present number is on “An Anomalous Exanthem: *Rosalia Idiopathica*,” by Dr. B. W. RICHARDSON.

There is an anomalous form of roseola of frequent occurrence, which is very apt to perplex the young practitioner from the close resemblance which, in some cases, the eruption holds to that of measles, in others to that of scarlatina, while in others, again, the leading characteristics of these two diseases appear, as it were, blended together.

The true character of the anomalous form of roseola referred to has been the subject of no little controversy among the physicians of continental Europe. By some it has been considered to be an affection com-

pounded of measles and scarlatina ; by others, as an imperfectly recognized form of the latter disease ; by others, as holding a place between measles and scarlet fever, but distinct from both ; and by others, again, as a disease resembling or simulating scarlatina, but having no other relation to it.

Dr. Richardson, after a careful study of the eruption under consideration, and an illustration of its general phenomena and course by the history of some of the cases of it which have fallen under his notice, considers it to be a distinct disease, having the following characteristics :—

“It is not contagious or communicable (the poison being fixed in character), except by direct inoculation. It shows no tendency to produce disease of the kidneys, or uræmia. This was true of all Dr. R.’s cases. Unlike scarlatina and measles, it is variable in its course ; it may terminate at once by active vomiting or purging, by which offending matter is removed from the alimentary canal, or it may continue on for an uncertain length of time, until it terminates in death.

“It is probably excited in the stomach, by the irregular digestion of some particular forms of food, which yield in the digestive process products of the fixed organic acid type, which products are absorbed from the canal into the blood.”

From the disease not being contagious, and from the fact that it arises in the body from previous mal-assimilation, Dr. R. has named the affection *Rosalia idiopathica*.

Dr. Ross, whose attention has for a long period been directed to an investigation of roseola, believes that it is “urticaria,” which has tended to mislead us. He has, he says, season after season, observed epidemics of a disease commonly called and recognized by the profession as scarlatina, which for twenty years at least he has been accustomed to distinguish as a different disease—a species of *urticaria*. The disease is sometimes, he adds, regarded as measles ; sometimes, too, as measles and scarlatina concurrent.

In respect to these opinions of Dr. Ross, Dr. Richardson remarks, and in his statements he is borne out by the results of our own observations, that in none of the cases seen by him were there any of the special characteristics of urticaria, such as great irritation of the skin, or raised surface in wheals—no true nettle rash.

A very interesting paper is presented by THOMAS HUNT, Esq., “On Certain Epidemic Cutaneous Affections observed in Schools, Factories, and Workhouses.” After pointing to the fact that epidemic influences operate to a greater or less extent in the promotion and spread of skin diseases, Mr. H. remarks that it is still more conspicuously evident that some of these diseases are greatly under the control of endemic, that is, *local* influences. Thus :—

“Rupia and ecthyma, neither of them contagious, will frequently enter a confined London court or alley, and affect almost all the inhabitants under the middle age, at one and the same time. But what I wish prominently to bring forward at this time,” continues Mr. H., “is, the effects of congregating and incarcerating many children or young persons under one roof, and feeding them continuously on the same diet ; thus promoting locally the more or less permanent inroads of certain cutaneous diseases, which diseases often subside spontaneously upon the removal of the sufferer from the locality.”

These diseases, according to Mr. H., are chiefly common ringworm (*porrigo scutulata*), and scabies ; the former being usually aggravated by the presence of a vegetable, the latter by an animal parasite. Dr. H. has never visited a workhouse, or a detachment of pauper children, or a large boarding-school occupied by the poor, without observing many cases of the

diseases just mentioned; one of them prevailing at one time, and the other at another—both showing a tendency to pustulation. These cutaneous maladies will often persist for months, in spite of the most careful treatment, and the most scrupulous attention to cleanliness and ventilation; their arrest demanding nothing short of an entire and radical change in the hygienic conditions of the community in which they are prevailing—change and variety of diet and occupation, and free daily exercise in the open air away from the limits of the building occupied by the affected community.

“Accounts of similar difficulties have reached me,” says Mr. H., “from medical practitioners who had the charge of institutions of the same character in different parts of the country; and the same kind of treatment proved equally effectual in all of them. In those factories where children are employed, and *boarded and lodged* on the premises, like occurrences are observed, involving the clean and the dirty, the well fed and the ill fed. The doctrine of contagion fails to explain the cause; nor, indeed, is any one imaginable cause to be named that is capable, *per se*, of accounting for all the peculiarities of the case. But it appears to me that by duly reflecting upon *all* the sanitary circumstances in which these children are placed, we may be able to discover an aggregate of influences, so to speak, which, not separately, but concurrently, may combine to produce these morbid conditions. Atmospheric impurity, unnatural diet, deficient exercise, and contagion, are the four conditions which appear to me to unite their several forces to perpetuate the loathsome affections of the skin. And yet not one of these causes, alone, ever presents a formidable difficulty in the treatment; neither does either of them exist in any prominent degree in these establishments. There is no sensible vitiation of the atmosphere, no bad smell, no defective drainage, no neglect of ventilation. The diet is excellent in quality, plentiful in quantity, wholesome in character, and correct in its chemical elements. Exercise is allowed and encouraged within the walls of the institution, and contagion is for the most part antagonized by care and cleanliness, and often by individual segregation; so that, considered apart, these causes of disease exist, if at all, in scarcely an appreciable degree; yet, together, they are capable of establishing a most formidable cachexia. They poison the blood, producing not only their immediate effects in the form of parasitic skin disease, but by laying the foundation, probably, of more serious disorders, manifested in after life by the presence of lumbrici, ascarides, tapeworm, pediculi, fungi, hydatids, tubercles, and perhaps cancerous germs in the various organisms.”

The paper which follows is an account, by Dr. G. BUCHANAN, of some of the leading facts connected with the recent *Epidemic of Typhus in Lancashire*.

There appears to be little doubt that the disease was the true maculated typhus. Though the fever appeared in the latter half of the year 1862 in various localities in the county, it prevailed to the greatest extent in the cities of Manchester and Preston. It made its first appearance in low, confined localities crowded with populations who were uncleanly and under-fed, and in its subsequent spread it was chiefly confined to similar localities, and in these its chief ravages were observed. From all the facts detailed we should infer that whatsoever influence any prevailing epidemic cause may have had in inducing the outbreak of typhus fever in certain parts of Lancashire, the production of the fever and its continuance were evidently due to certain *endemic* or local causes, and it was only in proportion as these causes were counteracted or removed that the fever was extinguished where it already prevailed, and its extension to new localities arrested.

A very instructive report is presented by Dr. WM. R. E. SMART, Deputy

Medical Inspector-General of the Royal Naval Hospital, Bermuda, "On the Yellow Fever Epidemics of Bermuda."

The paper is a well drawn up one, giving a general account of the Bermudas, their topography, the number, location, general character, occupations, and conditions of the inhabitants, with a rapid sketch of the several epidemics by which the islands have been visited since the year 1699 to the present time, with especial reference to the sanitary and medical condition of the people preceding the occurrence of those of yellow fever, and the leading facts in connection with the inception and course of these. We can only spare room for the general conclusions of Dr. Smart, which correspond very nearly with the views of the etiology of yellow fever entertained by the most authoritative of the American writers on the disease. They are as follows :—

"1. In the best recorded yellow fever epidemics of Bermuda, there has been generally coincidence of the same disease on the American coast, without, however, proof of transportation.

"2. On such occasions there has been an *epidemic constitution* displayed by catarrhal affections in the spring, and by gastro-hepatic disorders in the early summer, yielding to fever, which, at its climax, in the autumn, has assumed the type of '*yellow fever with black vomit*,' in a greater or less proportion of the attacks.

"3. During these *epidemic seasons*, comparative immunity has usually favoured the native population, and those of the European inhabitants dwelling under good sanitary conditions.

"4. The most intense manifestations have arisen in crowded barracks and convict hulks, especially where the healthy and sick have been kept together, and most of all where the sick of yellow fever have been treated in hospitals among the infirm of other diseases.

"5. Inasmuch as, in the worst instances recorded, it has been found that removal from infected localities has been followed always by an almost complete exemption of those not already affected, by amelioration of the condition of the attacked, and by an early extinction of the epidemic character of the fever, it is therefore just to consider the *essential causes* of the disease to operate, under ordinary circumstances, by *material local agencies* rather than by those of person.

"6. Sanitary measures are the means to be relied upon in the approach of the epidemic constitution in any locality.

"7. In the event of epidemic outbreak, the same means are highly valuable; but the only measure of certain value then is *removal* from the infected locality, and in case of crowded communities, as in barracks or ships, immediate dispersion into wider space of all within range of the noxious local elements.

"8. Although the direct proof of *personal contagion* may still be wanting, there are ample reasons for concluding that the highest degree of *local infection* may be generated in the hospitals—naval, military, and convict—so that the malady has been propagated among the attendants as well as among the sick.

"9. With regard to hospital arrangements for the treatment of yellow fever, owing to the peculiar predisposition arising from the debility of ill health, yellow fever hospitals should always be distinct and special, and under *sanitary cordon*.

"10. In the treatment of the disease, much depends on allowing the highest scale of space, for respiration and for diffusion, allotted to the sick in well-regulated fever hospitals, and considering the disadvantages of the climate of Bermuda, the minimum space, even where perfect ventilation can be maintained, should not be less than 1,500 cubic feet per man in fever wards."

E. SWARBRECK HALL furnishes a paper, replete with interesting facts, on "The Epidemic Diseases of Tasmania," exhibiting the influence of bad hygienic conditions upon the propagation of disease, more especially typhoid fever, scarlatina, influenza, and dysentery.

Tasmania is an island nearly as large as Ireland. It is situated between the 40th and 44th degrees of south latitude. The general elevation of the island is conical and mountainous. The altitude of the highest mountain does not exceed 5,000 feet.

The mean temperature of the coldest months—June, July, and August—is about 47° Fahrenheit, on an average of twenty years' observations. The greatest cold known during that period was 29 degrees. The mean of the hottest months—December, January, and February—is about 63 degrees. The highest recorded temperature in the shade is 105 degrees; but, on the whole, the thermometer rarely ranges above 90 degrees. There are, however, frequent and rapid transitions of temperature.

In 1861, in the fifty-seventh year of its colonization, the total population of Tasmania was 89,977, of which 41,649 were under twenty years of age. The sexes were, on the whole, nearly balanced, but there was a singular predominance of females over males at the ages of fifteen to twenty, supposed to be owing to the rush of the latter to the Australian and California gold fields.

The annual average of deaths, from all causes, in the Hobarton registration districts, during five years, from 1857 to 1861, both inclusive, was 602 $\frac{2}{5}$, giving a death rate of about 24 per 1,000 for each year. The population of the districts in 1861 was 24,773. This, contrasted with an annual death rate in the rural districts of 12 per 1,000, exhibits an enormous disparity.

Such a disparity, we are assured, is to be accounted for by the same causes that produce similar results in the cities of Europe; namely, the neglect of sanitary measures.

"No city," we are told, "could have a more healthy and more advantageous site than Hobarton, but defective water supply, inefficient sewerage, cesspools, interment of the dead in the midst of the living, great disregard of ventilation, etc., existed during the period under review."

Of the 602 $\frac{2}{5}$ deaths above referred to, 136 $\frac{4}{5}$ belonged to the *zymotic* class; which, we are told, is higher than usual, owing to the epidemic of diarrhoea and dysentery among children in 1858, of influenza in 1860, and of measles in 1861.

Smallpox and ague are, so far, unknown in Tasmania; scrofula and hydrocephalus are rarely met with; consumption of the lungs is also seldom met with among those born in the island. Forty-seven deaths per annum from *phthisis* are reported in a population of 25,000.

Of 235 deaths from *phthisis*, which occurred in five years, only 37 of the deceased were born in Tasmania. The hereditary tendency in many of these was great; both parents, natives of Great Britain, had died from consumption. Several of the thirty-seven were brothers and sisters. One family alone gave three of the number.

Mr. Hall has no doubt that the abundant supply of wholesome food—of which a good share is flesh—enjoyed by everybody in Tasmania, concurs with the salubrious climate in protecting the native-born from the tubercular diathesis.

Notwithstanding the variations and the wide daily ranges of temperature experienced in Tasmania, diseases of the respiratory organs are much less fatal there than in London. The annual average of *seventy* deaths is at the rate of about 2,800 per million of inhabitants, whereas in London the proportion is 3,716. It is evident, therefore, Mr. H. remarks, that the pure, dry air greatly modifies the effects of changes of temperature. No

doubt, also, the masses enjoy better clothing, food, and dwellings than they do in England.

The next paper, communicated by Dr. ROBERT LAWSON, Deputy Inspector-General of Army Hospitals, is entitled "Observations on the Influence of Pandemic Causes in the Production of Fever."

Of those wide-spread causes of disease which travel from one portion of the globe to the other, often, if not generally, in determinate routes, and over a belt of country of limited breadth, we know but little; of their nature and origin nothing; while with the laws by which their march and continuance are governed our acquaintance has not yet commenced. It is very evident that these epidemic or pandemic causes, in whatever they may consist, by whatever they may be generated or awakened into activity, are capable of causing the prevalence of disease independent of the ordinary climatorial, endemic, and personal morbid agencies, or of increasing in amount and spread and malignancy the ordinary endemic diseases which occur in certain localities at particular seasons of the year. It is equally certain that, notwithstanding the pandemic causes are capable of acting independent of all other morbid agencies in the production of disease, it is nevertheless very generally the case that, by the bad sanitary condition of certain localities, they are liable to be attracted from their direct course, their influence to be more certainly felt, the number of their victims to be increased, and the fatality of the diseases induced to be augmented.

"Individuals or bodies of men," Dr. L. remarks, "differ greatly in sensitiveness to the causes of disease, according as they are acclimated or not. Change of station, and, much more, change of climate, subjects them to a modification of the external influences acting upon the system, and some time elapses before the resulting modification of its action is fairly established. While this transition is in progress, should the individuals be subjected to other causes of disease, such as malaria, exposure, fatigue, indifferent food, etc., especially during an epidemic period, it is found they will be affected in higher proportion, and the mortality among them will be much greater, than among others who have become acclimated by a longer residence."

It is objected to the existence of a pandemic cause of disease that, were it true, every locality within its influence would manifest the disease or diseases to which it is supposed to give rise to an equal extent. The fact is, however, that, owing to peculiarities in the meteorological, local, or other circumstances of different localities under the same general morbid influence, disease may prevail to a very different extent in each, and attain its maximum one year at one, and in another year at the very next station to it; its intensity also varying from time to time. But while in a group of stations a high rate of mortality may occur at some in one year, and at others in another, yet, for the most part, the outbreak of sickness will be pretty well defined as to season in each. There is often, however, a striking difference in this respect between stations in the immediate vicinity, and these may retain their individual peculiarities for a long period of years.

The immunity from disease enjoyed permanently, or for a shorter or longer period, by places under quarantine, exposed to the same pandemic influence, and in close proximity with other places which suffer severely from the prevailing epidemic malady, has been adduced as an evidence in favour of the propagation of certain diseases by contagion. In New-Castle, Jamaica, fever prevailed in 1856, within certain limits, among a small body of troops, from September to December, causing considerable mortality; while in the immediate vicinity of these, and in the same cantonment, were positious

which remained entirely exempt from the prevailing fever. Had these exempted localities been placed under rigid quarantine from the commencement, many would have concluded that it was to this they owed their escape from disease, whereas the exemption enjoyed by them was in conjunction with the freest personal intercourse.

From investigations made by Dr. L., and published in a preceding paper, he deduces a law showing that a series of morbid causes originate, or at all events become apparent, in the southern hemisphere, and are propagated from that to the northern with great regularity.

"These waves occupy about two years in passing over a given station; the mortality from fever, of whatever description it may be, increasing during their passage, and subsiding again as they move onwards. They follow each other at intervals of a few years, and may be traced from the Cape of Good Hope, where they first become sensible, to Iceland. Some embrace Ceylon, in 80° E. longitude, and New Orleans, in 90° W. longitude, or nearly half the circumference of the earth. Were information for other places available, no doubt their passage might be demonstrated still more extensively. An influence of this description is more correctly designated '*pandemic*' than '*epidemic*,' and accordingly I propose designating the successive waves '*pandemic waves*.'"

According to Dr. L., a pandemic wave became apparent at the Cape in 1822, which reached the coast of Africa and Mauritius in 1823. Its influence was experienced in Ceylon, Malta, Gibraltar, and the West Indies in 1824. In the Ionian Islands and Bermuda, the high mortality resulting from a previous wave was continued this year. In 1825, Jamaica, in which had taken place, the preceding year, a slight advance in the death rate, experienced a terrible epidemic; the wave this year also overspread Nova Scotia and Canada. In 1824, the admissions into the fever hospitals in London and Dublin had increased; the same was the case in 1825 with respect to those of Cork, Glasgow, and Edinburgh. In England and Ireland the greatest sickness appears to have been in 1826 and 1827; in Scotland in 1828. In Iceland, typhus and some other forms of epidemic disease were very prevalent in 1828-29.

Another pandemic wave appeared at the Cape in 1824, and fever displayed much intensity there in 1825, when also it was experienced on the west coast of Africa, and slightly at Mauritius, but in 1826 more intensely, when it commenced likewise in the West Indies. In 1827 it was prevailing extensively in the latter location. An increase in the mortality from fever was experienced in 1827 in the Ionian Islands. In 1828 there was an intense epidemic of yellow fever at Gibraltar, and Malta had a decided increase in its death rate. The mortality in the Ionian Islands increased. This wave seems to have followed that which preceded it so closely, that among the civil population in Great Britain and Ireland it is difficult to separate the one from the other.

A pandemic wave appeared again at the Cape in 1827, and reached Great Britain in 1831-2; and another, experienced at the Cape in 1831, was in operation in Great Britain in 1835-36-37; and this course, as far as we can learn, seems to have been regularly pursued.

"The occurrences in the Mediterranean in 1828 are extremely interesting and important. There, under the same pandemic wave, while yellow fever was causing such mortality at Gibraltar as to induce many to think it an imported disease, the remittent fever, the undoubted product of the locality, was causing a much higher one at Santa Maura, and other forms of febrile disease—petechial typhus at Naples, and plague in Albania—were prevailing on either side the latter. It must, therefore, be concluded that though the pandemic cause determines the

occurrence of febrile disease in places over which it passes, the peculiar form, and even the frequency, of the disease is determined rather by the circumstances, whether meteorological, malarial, hygienic, or social, to which each population is subjected. The same local circumstances may exist in other years, and, so far as can be estimated, to an equal extent, but fevers do not become rife; but no sooner is the pandemic cause added, than these seem to acquire a potency which is almost inexplicable."

Though, as a general rule, the peculiar form of fever developed under the agency of the pandemic cause is that endemic to the locality, still there are important exceptions. Thus, yellow fever is only an occasional visitant of Sierra Leone and the coast of Africa, Gibraltar, Bermuda, New Orleans, etc. Plague, though commonly confined to Egypt, Syria, and Turkey in Europe, has shown itself also at Malta in 1813, in the Ionian Islands in 1815-16, in Noja, Italy, in 1817. The dengue fever, which of late years first attracted attention at Ragoon and Calcutta (1824), was seen in the West Indies in 1827-28.

"These casual eruptions of the new form of disease have always taken place during the passage of a pandemic wave, while other places, under the influence of the same wave, have manifested other forms of febrile affections. There were many instances of this. Thus, in addition to that of 1828 in the Mediterranean, already given, plague appeared in Corfu at the end of 1815, in a marshy district in which remittent fever had prevailed just before, and was thought to have been limited by quarantine, until it ceased in May, 1816. That year it broke out in the village of Comitato, a mountainous situation in Cephalonia, in the beginning of June. No measures were taken to limit it before the end of the month; nevertheless, it did not attack any one out of the village, where it ultimately disappeared in the middle of July. Such facts lead to the conclusion that the pandemic cause can determine to a certain extent the resulting form of fever, though local and temporary circumstances may often be more powerful in this respect, and may even determine a different form."

The interesting question as to the mode of action of the pandemic cause in the production of disease remains yet to be settled by a more extended and cautiously collated series of observations. We cannot say, as yet, whether the pandemic wave acts on the organism, rendering it more susceptible to the influence of the ordinary causes of disease, or on these themselves, giving origin to a more concentrated or a different kind of poison, which generates either a more virulent or a new form of disease; or whether it affects both, increasing the activity or altering the kind of the causes, and enhancing the liability of the body to be affected by them.

EDWARD R. HARVEY, M. B., gives an account of "An Outbreak of Typhoid Fever, at Wing, Bucks," in the latter part of the year 1862. The fever made its appearance in a village of 1,000 inhabitants, residing in 195 cottages, clustered on a hill or mound. During the autumn, winter, and spring of 1862-63 about 200 cases of the fever occurred, embracing one-fifth of the population. The mortality amounted to 9 per cent. of those attacked.

In the village referred to, Mr. H. ascertained, by personal inspection, that the ordinary causes of typhus fever were abundantly present: insufficient drainage, impurity of the water used for drinking, cooking, etc., overcrowded, ill-ventilated, and dirty dwellings, insufficiency of latrines.

Now, as to the origin of the fever referred to: Was it the result of local and domestic morbid causes, or was it imported? The clergyman of the place adopted the latter view. It appears that a young man had returned home sickly in the autumn; that in the course of three weeks or a month subsequently he had certainly typhoid fever; that other members of the

family had it, and that the disease became especially prevalent in the immediate neighbourhood of his dwelling. If it were certain that the illness this man was labouring under when he returned home was fever, and that no case of fever existed at that time in the village, or had existed for some time previously, then it would be fair to infer that the fever might have been brought into the place by the individual alluded to. But we are assured that when he arrived he had no symptoms that indicated fever, he was not aware that he had been recently in a fever district, nor could it be positively shown that his was the first case of fever. There had certainly been a case of fever in a neighbouring hamlet, and it was thought by the medical men of the village that there had been one or two there as early as that of the young man referred to. All, however, were agreed that fever had appeared, if not first, very nearly so, in the cottage where he lived, and had spread thence to those surrounding it.

"If," says Mr. H., "we adopt the opinion that the fever was self-generated, how are we supported by facts? A violent epidemic of typhoid fever burst out at Wing; the place is full of such nuisances as would lead to its development. When its origin is attempted to be traced, the clergyman of the place, devoid of all knowledge of the theories on the subject, pronounces it as his opinion that the fever had originated in a cottage proverbially filthy, where fever had, in the preceding three years, proved especially fatal, and where, on the occasion in question, the first person attacked was a young man in delicate health, who had lately arrived at the house, and was consequently peculiarly susceptible to the poison. Though there is some doubt as to this being the first case, it is admitted on all hands to have been one of the centres from which the fever emanated, while there are no facts whatever to justify the opinion that the fever had been introduced by the new-comer."

J. F. MARSON, F. R. C. S., Surgeon to the Smallpox and Vaccination Hospital, London, presents a report of the trial of "*Sarracenia purpurea*, or the Pitcher Plant, in Smallpox."

Mr. M. tried the decoction of *sarracenia*, made by simmering one ounce of the root in a pint and a half of water for four hours, until reduced to a pint; one-fourth of this being usually given as a dose, twice a day, for two days or more. He also gave, in some cases, a liquor *sarracenia* supplied by Messrs. Savory and Moore. Fifteen cases of smallpox were treated by him with the *sarracenia*. These cases were selected for their severity—such cases as, it was believed, would not get well under ordinary treatment. All of the fifteen cases proved fatal.

"The cases," Mr. M. remarks, "were selected on admission in the early stage of the disease, on account of the severe symptoms manifested, and because I felt it was of no use to try the efficacy of the *sarracenia* on mild cases, or vaccinated cases, that I knew very well would recover without anything being done for them beyond the ordinary care of such cases, by giving salines, if required, occasional aperients, and suitable diet, etc. I cannot say that the *sarracenia* had any effect whatever. It did not save life; it did not modify in the least the eruption; it did not influence any of the secretions; it did not increase the amount of urine; it only in one instance seemed to act on the bowels; this seeming effect might, however, easily have been from other causes."

An account of "An Epidemic of Jaundice at Rotherham, Yorkshire," is given by Dr. WM. ORD. Rotherham with Kimberworth form together one large town, intersected by the river Don. It contained in 1861 a population of 18,922. The staple industry is the manufacture of iron. During the first two months of 1863, after a very unhealthy season, chiefly characterized by the prevalence of typhoid fever, many of the residents in

the townships and their vicinity were attacked with an illness of which jaundice formed the most prominent symptom. The cases of the disease which came under treatment amounted to 200, and of those which sought no medical aid there were probably 100 more. One death is attributed to the disease.

The attack usually commenced with some disorder of digestion, flatulence, loss of appetite, nausea, or vomiting. Vomiting was present in about half the cases. These symptoms were often preceded by shiverings, and were always attended by languor and depression. In many cases distinct catarrhal symptoms were present, also, with relaxation of the throat, and frequent accumulation of mucus in the fauces. There was pain at the epigastrium, occasionally in the right hypochondrium, with a feeling of fulness and distension, and distinct tenderness, but without fever. After two days these symptoms abated, and from two days to a fortnight from the commencement of the attack a tint of jaundice appeared in the sclerotica, and spread over the body. The urine became deeply tinged with bile, and the alvine evacuations pale or colourless. In mild cases, the tinging of the urine was the first indication of the nature of the disease. The liver exhibited neither enlargement nor any marked tenderness on pressure. In two cases, there was felt what was believed to be a distended gall-bladder projecting from under the edge of the liver. The tongue was coated, and more or less white; the bowels were irregular, but most commonly constipated; copious bilious evacuations often gave much relief. In some cases it would seem to have averted an attack of jaundice. The attack throughout was without fever. Few patients were confined to bed, or prevented from following their usual occupations. The jaundice usually lasted from one to three weeks, when, with or without remedies, it would gradually disappear.

The only case in which death occurred was in a female, who was attacked with the disease a few days before childbirth, and died comatose two days after her confinement. In six cases of the disease in pregnant women premature labour was produced.

The proportion of persons attacked under twenty years of age was very small. Among the exceptions were some children. Intemperate habits are believed to have increased the liability to the disease. Neither locality nor occupation appears to have had any effect in the development of this disease. The cases of it were scattered over all parts of the town, good and bad, and among all classes.

No connection appears to have existed between the epidemic and that of typhoid fever in 1862. Few of the patients had suffered from the latter. Where jaundice occurred in houses previously visited by fever, those inmates who had suffered from the latter escaped the second epidemic. Jaundice did not appear to spread by infection.

In regard to the nature of the disease, it was considered by one physician to be a form of yellow fever. Others referred the jaundice to an obstruction of the common gall-duct, consequent upon duodenal or gastro-duodenal catarrh, which opinion Dr. Ord thinks to be most in accordance with the symptoms.

In the decline of the epidemic, about April, a slight amount of fever was observed during the first days of the attack, about the same as accompanies the earlier stages of any acute catarrh. It was of short duration. Three more cases of premature confinement were reported, in one of which death by coma occurred on the third day.

The cases of the disease were scattered over all parts of the town. There

were certainly no foci of jaundice production, no defined spots in which cases were more thickly grouped than elsewhere. The cause of the disease is supposed to be probably a morbid condition of the atmosphere of the town, and especially of that of dwellings.

"There is reason to believe," says Dr. Ord, "that the atmosphere was severely polluted by exhalations from the river and its banks. They are said to be often highly offensive, particularly at night and in still weather.

"From the obstructed condition of certain drain-pipes, which have been taken up and examined, it may be inferred that, owing to insufficiency of flushing water, the smaller pipes are in other places similarly obstructed. Where pipes become thus obstructed, the ground near and above them becomes, in process of time, a diffused cesspool, the gases from which have often but one outlet, the sinkholes in houses."

The drinking water appears, also, not to have been entirely free from organic impurities. The daily supply was also diminishing in consequence of the dryness of the weather.

Upon the decline of the jaundice, in May, diarrhœa, but of no great severity, affected a large number of persons in Rotherham.

Several histories of epidemic jaundice are on record. In five out of eight of these epidemics, the jaundice was associated with intermittent or remittent fever, or with spasmodic affections and febrile delirium, and attended with great mortality. In the remaining three epidemics the jaundice was the most prominent symptom. It was unattended with fever, and, except in the case of pregnant females, was not destructive to life; the disease resembling, in its general features, that observed at Rotherham.

The first occurred at Ludenscheid. Of seventy persons attacked, only three died, of whom two were women who died after abortion. Of five pregnant women attacked, three aborted; the two of those who died were, subsequently to the abortion, attacked with fever and delirium. Few children were attacked. Associated with the epidemic there was an unusual prevalence of bilious diarrhœa and bilious fever.

The second epidemic was at Chasselay, on the Saone, in France, in the autumn of 1841. The disturbance of the general health was in many cases so slight that, excepting from the jaundiced hue of the patients, it would not have been known they were ill. Most of those attacked were adults. The epidemic lasted three months; no one died of it.

The third epidemic occurred at Martinique, in April, 1858; it reached its acme in June and July, and lasted on until the end of the year. It affected all races, adults more than children. The termination was almost invariably favourable, excepting in the case of pregnant females. Three other females, young girls, and an old maid of sixty, died of the jaundice. Of thirty pregnant women who were attacked, twenty died comatose after abortion or premature labour. There was only one serious form, the comatose. All who were attacked with it died, with only one exception, a child. The children thus affected were not jaundiced.

"The Present Position and Prospects of Epidemiological Science," is the subject of the opening address of the thirteenth session of the Epidemiological Society, delivered by Dr. BENJAMIN W. RICHARDSON. The address is a very able one, and replete throughout with interest and instruction. The author inquires, first, what has been already effected in the improvement of our knowledge of the etiology and nature of epidemic diseases, and what are the prospects of an enlargement of that knowledge in the future.

In reference to our present attainments in epidemiology, Dr. R. enumerates, first, the definition almost absolute of each of the diseases of the epidemic class, at which we have at length arrived. In respect to the mode in which the diseases of this class are produced, we have learned, as a firm and sure basis of further observation, the fact that the true epidemic disorders are essentially specific, as a general rule, in particular classes of animals.

"We are cognizant of the fact that scarlatina is peculiar to man, or at most to man and the pig; the smallpox of man is a disease specifically one; while the sheep-pox is peculiar to sheep, and admits by no means whatever of transmission to any other known domestic animal, nor to man; that the pleuro-pneumonia of cattle, while easily propagated from one of the bovine tribe to another, is capable of no further transmission; and that measles, whooping-cough, and true Asiatic cholera are peculiar to the human race. This knowledge of distinction of disease according to animals is not merely an interesting part of our researches, but an important practical lesson. It will assist, in a future day, to an immense extent, in clearing up questions of causation; in other words, it will enable the etiologist to explain the nature of certain poisons, by a process of reasoning based on the peculiar organization of the animals in which the poisons are capable of producing special diseases."

Second, there have been revealed to us many approved facts in relation to the influence of season on certain formidable diseases.

We have determined, thirdly, the geographical limits of almost all the great epidemical diseases. We can assert of diseases that they have their habitats and stations, and with which we are acquainted.

We have learned, fifthly, that according to elevation above the surface of the earth diseases undergo change. Yellow fever, for example, never ascends a mountain above the height of four thousand yards, even in tropical climates.

Finally, it is believed that the law is now pretty well established, that each disease has for its cause one specific poison.

"Still standing on the past," says Dr. R., "we have two further facts before us, each of great importance, and each very wonderful. The first of these is, that epidemic diseases belonging to certain classes do not, as a general rule, recur in the same person; and the second, that in one disease—I refer of course to smallpox—we have in our hands an almost certain prophylactic."

"From the land over which we have glanced, we must look next to the prospects that lie in view. Which way shall we go, with cheerfulness hoping for success? As it appears to me, there is promise of successful travel in three directions. 1. Towards a better knowledge of the sources of the poisons of the epidemic class. 2. Towards a more correct appreciation of the changes produced in the body by these poisons, and of the way in which they cause the destruction of life. 3. Towards a more correct view in respect to the modes that should be adopted to destroy the effects of the poisons in the living organism."

Dr. ARCHIBALD SMITH gives us the histories of an Epidemic Malignant Fever which prevailed in Peru during the years 1719–20, and of an Epidemic Catarrhal Fever or Influenza which prevailed in the Mexican tablelands in 1736, and again in 1855, exhibiting as its most prominent symptom a hemorrhage from the nostrils. In 1855 it attacked chiefly women of sanguine temperament and between the ages of 35 and 50.

Dr. BRYSON communicates an account of "An Epidemic of Pleuro-pneumonia," which occurred in the Mediterranean fleet in 1860. This history is an interesting one, and not without instruction. It presents no particu-

lar points of novelty ; and to obtain from it the knowledge it is calculated to impart, the account should be studied *in extenso* as given by the reporter.

The next paper consists of "Notes," by Dr. GAVIN MILROY, on the Epidemic and other Diseases of the Natives of India. This paper, which is itself a bare outline of a few general facts and conclusions, based upon very defective and unsatisfactory statistics, and partial and loosely-collated observations, would not admit of any instructive analysis. We present only the closing sentences :—

"In concluding these brief and very imperfect notes, I would simply remark that the more we make ourselves acquainted with the prevailing diseases among the native population in India—and the remark is equally applicable to other countries—the more convinced we must feel how much may be done by wise prophylactic and preventive medicine to avert or diminish the sickness and suffering that abound everywhere. The fevers and fluxes which prove so destructive to health and life are largely due to the undrained and jungly, therefore malarious, state of the land. As systematic cultivation advances, so will those maladies abate in frequency and force. Then, too, the famine fevers, hitherto almost periodic in some parts of India, as they used to be at one time in Europe, will become less common. Hitherto the want of sufficient and wholesome food, to which must be added that of proper clothing, among the natives, has powerfully aided the pernicious influence of the damp and filthy condition of their dwellings and surroundings. That a vast amount of that desolating scourge, the cholera, not to specify other diseases, is due to these local and personal causes, cannot be questioned. The natives sometimes suffer severely from it, while the contiguous military station is exempt. It is a most significant and suggestive fact, that most of the outbreaks of epidemic diseases among our troops seem to have their starting-point in the contiguous native villages or bazaars, these being generally first affected before the sickness appears in the barracks or cantonments. The lesson is obvious. Let a more vigilant and active supervision be maintained over the healthy condition of the natives, and the benefit that will accrue will be felt by others as well as by themselves—so true is it in a physical as well as in a moral sense, that 'no man can live unto himself, and no man can die unto himself.'"

The article next in order is "The Address of Dr. BABINGTON on vacating the Presidential Chair," April 4, 1864. The address embraces a brief sketch of the organization and object of the Society, and the success which has, so far, attended its operations.

A paper by Dr. BABINGTON follows, "On an Anomalous Form of Eruptive Disease, which it is proposed to designate *Rubeola Notha*." This form of disease seems to have prevailed epidemically in London in the spring of 1864. Dr. B. describes it as a papular eruption, resembling in many respects rubeola, but occurring in a large number of cases in those who have already had that disease. It is preceded for several days by headache, loss of appetite, slight fever, coryza, and sneezing. When the eruption appears, the papule are less distinct than those of measles, and are not arranged in crescentic clusters ; it appears on the face, neck, and trunk, but very slightly, if at all, upon the extremities. It is most vivid on the second day of its appearance, and disappears the third. With the occurrence of the eruption, the febrile symptoms abate. More constitutional disturbance, in proportion to the extent of the eruption, exists in this disease than in rubeola, but convalescence is speedy and complete. From roseola it differs in not being symptomatic of any other disorder—the eruption being papular in character, and in circumscribed patches, which are more dusky in hue than is the diffused effervescence of roseola. There is also more marked congestion of the head, and less irritation of the stomach ;

the complaint also runs a more definite course. It is to be distinguished from scarlatina by the papular eruption and by the absence of any marked disease of the throat. It is followed by no disease of the kidneys, or other dangerous sequela.

In regard to treatment, the febrile symptoms are best met by salines, diluent beverages, and a light diet. Gentle aperients are occasionally required; during the eruption, however, spontaneous diarrhœa sometimes occurs. Considerable debility during convalescence will often indicate the use of tonics and stimulants.

From the general resemblance of this eruptive epidemic to rubeola, Dr. B. proposes to designate it "*Rubeola notha*," or bastard measles.

The "Report on Epidemics in Great Britain, 1863," by J. N. RADCLIFFE, is a very full and most interesting one, but of which it would not be possible to present an analysis, sufficiently concise to come within our limits, that would possess any value to the reader. We must content ourselves with a brief notice of the several epidemics of which it treats.

1. *Scarlet Fever*.—This was the most prevalent and fatal of the epidemics of 1863. The mortality produced by it in London was the greatest that has occurred since the present system of registration has been adopted. The fatality and prevalence of the disease would appear to increase in London with the increasing population. For the first five years the average annual mortality from scarlatina in the metropolis was 1,162; in the second, 1,868; in the third, 2,298, and in the fourth, 3,604—the annual average for the whole period being 2,260. The periods of unusual activity of the disease have not only become more frequent, but more protracted. The years of excessive mortality were 1839, 1844, 1848, 1852, '53, '54, and 1858, '59, '60, '61, '62, '63. In these years the mortality exceeded the average of twenty-five years. In 1863 the mortality was more than double this average.

2. *Smallpox*.—The average mortality from smallpox in children under five years, in the ten years, 1851–60, was 103 in every 100,000 living. In 56 infected districts in 1863 the entire mortality from the disease during the period indicated was less than the average, and in 35 it was in excess. The average mortality from smallpox among young children is from 0 in many places, to 463 in Plymouth. In London the mortality from smallpox in 1863 was, during the first quarter, 422; during the second, 788; during the third, 512; during the fourth, 290; making a total of 2,012—the largest mortality from the disease since 1838.

In Scotland the deaths from smallpox in eight towns, during 1863, were 816—or three per cent. of the total deaths.

"If," says Mr. R., "the mortality from the wide-spread prevalence of smallpox in Great Britain prove to be as great in proportion as the deaths from the disease in London, the mortality returns of 1863 will be a humiliating illustration of the incoherencies of British state-medicine. Of the source of the recurrent and wide-spread outbreaks of smallpox in Great Britain—*imperfect vaccination*—no doubt can exist."

3. *Measles*.—The average mortality from measles in England for ten years—1851–60—was 280 in every 100,000 persons living under five years of age. In 46 localities infected in 1863 the mortality during the above ten years was less than the average of the kingdom, in two the mortality was equal to the average, and in 24 it was above. In London the deaths in 1863 were, during the first quarter, 576; during the second quarter, 48;

during the third quarter, 221 ; during the fourth quarter, 295—total, 1698. In 1862 the mortality was 2,281 ; in 1858 it was 2,383.

In Scotland, in 1863, the deaths from measles in eight towns amounted to 998, or 3.6 per cent. of the total mortality. Leith and Edinburgh were the only towns where this proportion was exceeded. In the first 7.5 per cent. of the deaths were attributed to measles, and in the latter 4.3 per cent.

4. *Continued Fevers*.—The average mortality from continued fevers, at all ages, during ten years—1851–60—was 91 in every 100,000 living. In sixteen infected districts in 1862 the mortality from these fevers during the ten years, as above, exceeded the average of the kingdom ; in thirteen it fell below the average. In London the deaths from fever, during 1863, were—first quarter, 785 ; second quarter, 624 ; third quarter, 652 ; fourth quarter, 881. In the corresponding quarters in 1862, the deaths were—991, 1,015, 883, 796. The total mortality from fever in 1863 was 2,892 ; in 1862, 3,635 ; in 1861, 1,754.

In Scotland the prevalence of continued fever was reported from sixteen districts in the first quarter, from thirteen in the second, from eleven in the third, and from twenty-four in the fourth.

Typhus, in its several forms of gastric, typhoid, typhous, and infantile fever, is reported to have been the second most fatal epidemic which prevailed, destroying 1,398 persons in eight towns during the year, being 5.1 per cent. of the general mortality. This proportion was exceeded in certain towns : thus, in Leith the proportion of deaths from fevers was 9.7 per cent. to the entire mortality ; in Aberdeen, 7.3 ; in Perth, 6.1 ; in Greenock, 5.2. In Glasgow the proportion was 5.1 per cent. of the deaths ; while in Edinburgh, Dundee, and Paisley only 4.2 per cent. of the deaths were attributed to continued fevers.

5. *Diphtheria*.—The average mortality from diphtheria, at all ages, for ten years—1851–61—was 11 in every 100,000 living. The range of mortality was from 0 in the Scilly Islands, to 310 in Howden, Yorkshire. In fifteen infected districts in 1863, the deaths from the disease during the ten years, as above, were above the average ; in 21 they were below, and in 1 they were equal to the average. In London the deaths from diphtheria were, in 1863, 724 ; in 1862, 734 ; in 1861, 697. In 1863 the deaths amounted in the first quarter to 178 ; in the second, to 175 ; in the third, to 192 ; in the fourth, to 179.

In Scotland the prevalence of diphtheria increased from 1861 to 1863. The deaths from it in 1861 being, in eight towns, 151 ; in 1862, 285 ; in 1863, 478, or 1.7 per cent. of the general mortality. In England and Scotland diphtheria prevailed alone in 57 districts ; in conjunction with scarlatina, in 34 ; with smallpox, in 9 ; with measles, in 7 ; with fever, in 5 ; with sore throat, in 3 ; with croup, in 3 ; with catarrh, in 3 ; with hooping-cough in 1 ; and with measles and croup, in 1.

6. *Hooping-Cough*.—In London 2,229 deaths from hooping-cough were reported during the year. In 1862 the deaths amounted to 2,150 ; and in 1861 to 3,497. In Scotland, during 1863, 976 deaths from the disease are reported, or 3.6 per cent. of the entire mortality. In Greenock the deaths from hooping-cough constituted 7.6 per cent. of the mortality ; in Glasgow 4.5 of the mortality was caused by it.

7. *Diarrhœa*.—This disease, during 1863, prevailed in England in twenty-seven districts, during June, July, and August. In London the deaths in 1863 amounted to 2,448 ; in 1862 they were 1,735 ; in 1861,

2,625. In Scotland the disease was reported as prevalent in two districts during the first six months of 1863.

8. *Croup*.—Four local outbreaks of croup are recorded as having taken place in Scotland during the first and fourth quarters of the year 1863. Six hundred and forty children died of the disease in eight towns, constituting 2.3 per cent. of the entire mortality. In London the mortality from croup in 1862 was greater than it had been since 1837. In 1863 the mortality was somewhat less, the deaths numbering 927.

“Remarks on the Enthetic Diseases affecting the Health of the Troops serving in the United Kingdom for the years 1837–46, 1859, '60, '61.” By Dr. FRANCIS BOWEN. Enthetic diseases comprise all the forms of venereal disease, an affection which has done as much perhaps as any other to destroy the health, vigour, and efficiency of our soldiers and sailors, and to prevent the prevalence of which no efficient measure has as yet been suggested. It is not only the loss of the services of the soldier and sailor from the direct effects of the venereal disease that is to be deprecated, but from its remote effects in undermining the constitution, and giving rise to pulmonary consumption and other fatal maladies, which disqualify the men permanently for military service. With this evil the medical officers, whether of the navy or of the army, must ever fail to contend with success unless proper and efficient police regulations are enacted to restrict the source from which the evil emanates. This is, in fact, the only means whereby a great and really terrible evil may be lessened, if not abolished, and a better state of public health become the result.

“On the Prevention of Syphilis in the Navy.” By Dr. DICKSON. The same general subject treated of in the foregoing paper is discussed in the present, though approached from a different direction, and considered with especial reference to the navy. Both papers are written evidently with a good deal of care, and with a perfect understanding of the importance of the subjects discussed. We recommend them both to the consideration of the medical authorities to whom is more immediately committed the protection of the health and lives of those who man our navy and fill the ranks of our army.

The means of prevention suggested by Dr. Dickson consist in a local sanitary police, including two departments: 1st. An *executive* department for the registration of all known and professed public women of the place, for visitation of their dwellings, and general surveillance; and 2d. A *medical* department for the periodical inspection of the *registered*, and for their treatment when convicted of disease, in an hospital, where their entrance and detention should be legally compulsory. A special passport system to prevent evasion, and occasional appeals to the civil power to test the efficiency and honesty of the police supervision, would also seem to be essential.

“On the Cause, Malignancy, and Persistence of Yellow Fever aboard Ship.” By Dr. A. N. BELL, of Brooklyn, New York. This is a very sensible paper.

“Stagnant air, dampness, and warmth,” Dr. B. remarks, “are frequently the inseparable conditions of the holds of vessels in warm climates. If to these conditions there be added a filthy vessel, putrid provisions, or bad water; or if the cargo consist of material peculiarly liable to infection, such as rags, hides, feathers, sponge, or sugar, the circumstances are then complete not only for the reception of the poison, but for its origination and continuance.

“Malignancy of yellow fever appears to depend primarily and most generally

upon suddenness of exposure to the poison; and secondarily upon an atmosphere unfavourable to recovery.

"Certain materials of commerce and clothing, when exposed to the conditions which evolve the virus of yellow fever, are prone to become infected, and such things become new centres or fomites for its retention and further propagation. If, therefore, a ship is in such a state or has such material on board as will favour the reception of the poison, she is proportionately well conditioned for its retention. And it will exist, under such circumstances, just as long as the conditions favourable to the decomposition of organic matter continue. Upon the suspension or cessation of these, the evolution of the virus will also be suspended or cease. If suspended only, under favourable climatic conditions, it will again be renewed; and it may be transported to far distant, though similar regions to that from which it took its origin. Hence the liability of yellow fever to occur annually in some places, and to break out again and again aboard of the same ship, and to be propagated to new localities favourable to its reception, even where it had never existed before. Fomites from a vessel thus conditioned may have been so warmly and securely packed as to admit of transportation even into a comparatively cold climate, and yet continue for a time liable to strike a blow when least expected.

"The most effectual means of getting rid of yellow fever infection on board of ship, or that which may be contained in fomites, are suggestive of the true nature of the virus. They are precisely those which are known to be most efficacious for the arrest of putrefaction, namely, the extremes of temperature and powerful chemical agents."

"Results of Revaccination in the British and some of the Continental Armies, with some remarks on all cases of smallpox reported as having occurred among the troops from 1859 to 1861 at the Home and Foreign Stations of the Army." By Dr. FRANCIS BOWEN. This paper contains a fund of statistics showing the prophylactic value of revaccination. They prove conclusively, as Dr. Balfour had stated, "that so large a reduction in mortality and in the occurrence of smallpox has taken place from the practice of revaccination, as to leave no doubt of its practical efficacy."

The article next in order is a very neat biographical "Memoir of Dr. James Ormiston M'William," by Dr. BABINGTON.

From the "Report of the Smallpox and Vaccination Committee," we can spare room only for the following summing up of the deaths from smallpox in London, from the year 1838 to 1863, both inclusive—twenty-six years. Total number of deaths 23,817; showing an annual average of 916 deaths. For three years, 1838–40, before the enactment of any laws in reference to vaccination, the deaths from smallpox amounted to 5,686, being an annual average mortality of 1,895. For thirteen years, 1841 to 1853, both inclusive, when vaccination was provided gratuitously, but not made obligatory, the deaths from smallpox amounted to 10,845, being an annual average of 834. For ten years, 1854 to 1863, both inclusive, when vaccination was made by law obligatory, the deaths from smallpox amounted to 7,286, being an annual average mortality of 728.

The final report is on "The Classification of Epidemic Diseases." From this most valuable paper we should be tempted to make frequent extracts, were it not that we have already extended our notice of the collection of epidemiological transactions to a length far beyond what may be, perhaps, considered as reasonable.

D. F. C.

ART. XXII.—*Causes Célèbres*. Par A. FOUQUIER. Cahiers 29, 30, 31. *Affaire de Couty de La Pommerais*. Paris, 1864. Large 8vo. pp. 240.

THIS remarkable case, which has attracted, as it deserves, great attention in Europe, is very fully reported in the "*Causes Célèbres*" of Fouquier, and is replete with interest for the pathologist, the toxicologist, and the practitioner of medicine. We will endeavour to offer a brief and intelligible statement of the principal points involved, confining ourselves to the professional and scientific topics discussed.

The trial was held in 1864, in Paris, at the Cour d'Assizes—exact date not given. The president of the court was M. Salvaing de Boissieu. The seat of "*Ministère Public*" was occupied by M. l'Avocat-General Oscar de la Vallée, assisted by M. Bondurand, subst. du Procureur-General.

The case may be thus stated: On the 17th October, 1863, the widow de Pauw, Julie Françoise Testu, died in Paris under circumstances which induced the belief that she was poisoned. She had lived in "intimate relations" with Desiré Edmond Couty La Pommerais, and was still supposed to be his mistress; indeed, avowing herself to be pregnant by him. He had insured her life in several offices, and for an enormous sum—not less than 550,000 francs—on which he had paid one instalment of premium; another was about to become due. She was in her usual health on the 16th—having dined heartily. That evening he spent with her; she was taken ill in the night; was found in the morning alone, much exhausted by vomiting and other sufferings, and so lingered through the day. Death occurred at half-past six in the evening. La Pommerais was a physician, a homœopath, he called himself, in regular practice; had attended her husband in his last illness, and, continuing in charge of the family, had made the widow his mistress. Upon his marriage, some time subsequently, he abandoned her, but had within a few months renewed his connection with her. He was the last person who had seen her previous to her violent attack of illness. He was deeply interested in her death, or believed himself to be: he had conspired with her to defraud the insurance offices.

In the perusal of the report before us, we cannot help being profoundly impressed with the peculiarities of the French method of administering justice, so different from all that we are accustomed to, and so strongly displayed here at every step of the process. We of the English stock are in the habit of looking to the presiding judge as a protector, if not indeed the defender of the accused, who is, by prescriptive right, "presumed to be innocent, until he is proved to be guilty;" the whole "burden of proof" being thrown upon the "prosecution." We allow—nay, we advise and enjoin upon the latter to be silent and reticent, while his advocate carefully watches, curbs, and reduces to its minimum the testimony brought against him. He must not be addressed with any harsh or menacing expression, or required to give an extempore reply or explanation of any fact or circumstance, however strongly unfavourable. Now, for our own part, we agree with Jeremy Bentham, that our English mode of inquiry in criminal jurisprudence is entirely too narrow, our rules of evidence absurdly restricted; but we would not change them for those of the French courts. Our course is on the whole much fairer and more impartial, and far better adapted to shelter the innocent, though the French method may be somewhat more effectual in the detection of guilt. The judge and the prose-

cuting attorney join in assailing the unfortunate accused; the former questions him at indefinite length upon all points, relevant or irrelevant, at his discretion; and demands of him authoritatively, upon the spur of the occasion, the revelation of any apparent mystery, the solution of any suggested difficulty, the motive of any alleged act. It becomes too often—it tends always to become—a trial of skill between the parties; they grow warm in the conflict; the accused loses his presence of mind, and may be led into dangerous or prejudicial admissions—we are speaking now of an innocent person, brought under a plausible imputation—the judge gets out of temper; taunts, threats, and denunciations issue from the bench, and the poor prisoner's case is decided against him in the course of the preliminary conversation, often exceedingly prolonged, as in the present instance, which ushers in the actual trial. La Pommerais was thus condemned, plainly enough, whether justly or unjustly, by the magistrate who conducted the examination, and presided over the court.

Perhaps there may be no doubt of his guilt, nor of the strict justice of his sentence and execution; but it seems to us absolutely clear that if he had been innocent on the other hand, the mode and animus of the whole proceeding left him no chance of escape, and must equally have resulted in his condemnation.

But we propose to analyze for our readers the professional portions of the trial only, and must not enlarge upon these matters, however much they interest us.

The counsel for La Pommerais, M. Lachaud, of whose eloquence and ability it would be difficult to speak in terms of too high eulogy, contended, and we think with reason, that the court allowed throughout, if indeed it did not make, an unwarrantable confusion of points which admitted of separation and should have been considered apart. The paramount fact of poisoning should have been irrefragably established; then the murderer should have been sought for; and in this second inquiry all the circumstances which brought La Pommerais into evil odour with the community, and indicated him as the sole individual likely to profit by the death of the victim, all these, we say, would have been relevantly introduced. But they were out of place when urged as they seem to have been, and kept perpetually before the eyes of the jury, as tending to prove that the death of Mme. de Pauw could not have been natural. La Pommerais was doubtless a scoundrel, a swindler, an infidel, a hypocrite, a debauchee, an adulterer, a thoroughly bad man. If his mistress and associate in purposed crime died a violent death, he was probably—nay, one may affirm certainly, the murderer. Had we been upon the jury, we should probably have agreed to pronounce him guilty; but it would have been upon the circumstantial evidence, not on the direct proofs which the judge repeatedly declared to be unanswerable and complete. On the contrary, we are persuaded that if no one had been interested in her death, no one would have been even suspected of administering poison to her. The manner of her attack and its progress to a fatal result, viewed in connection with her previous and present state of health, real and fictitious, gave no ground for surprise, and were far from offering anything strange or shocking. It will be seen that we are at issue, on this matter, with the Dean of Faculty, the distinguished and learned M. Tardieu, whose high character gives weight to all his opinions, and whose errors—we shall venture to call them so—are likely to mislead those of our profession who look up to him for guidance. It is not to be denied that physicians have suffered in courts of justice more

than once of late years by the uncertainty, vacillation, contradiction, and incongruity of sentiment and scientific views elicited during the examination of experts called to give testimony in cases of poisoning.

M. Tardieu decides positively that Mme. de Pauw was "done to death" upon the following grounds: 1. That she died suddenly, in the sense of "unexpectedly," no previous symptoms giving warning of the approach of danger. 2. That she died with symptoms of peculiar violence. 3. That her health had been very good up to the moment of attack. 4. That a post-mortem examination showed all her organs to be in a sound state. Thus far every practitioner will feel that the reasons for his assumption are so insufficient and unsatisfactory as to require that he shall be plainly shown to have alleged them in earnest.

Sudden death, with violent symptoms, in persons previously enjoying good health, is not a rare phenomenon, and this death was not sudden in a startling sense or degree, for Mme. de Pauw was taken ill in the night and died at six the next evening. Thousands have died of cholera within twelve hours; she died with gastric and internal suffering. Every pathological anatomist is familiar with death from functional maladies of the nature just indicated, and, indeed, of indefinite variety, in which the most careful autopsy detects no lesion. Nay, M. Tardieu should be aware of the fact that we do not, by any means, universally look to the lesions, when any such exist, as indicating the cause, or even the mode of death. But he distinctly asserts "the necessity of searching elsewhere than in a spontaneous disease the cause of death," when by post-mortem examination he had ascertained "the absence of every trace of recent or ancient disease, and of every lesion which might explain the rapid death by any natural cause." We find him repeatedly insisting on the force and correctness of this inference. We shall also find that in one of these points assumed he was certainly wrong, if not in all.

He is most positively contradicted by the strongest testimony as to the previous health of the subject. A sudden death often happens from undetected as well as detected causes, in *invalids* as well as in the most *vigorous*. Such deaths, too, are attended with violent symptoms, or occur without them, independently of any relation to external causes forcibly applied, or of the poisonous character of the agents used. When opium has been taken, or prussic acid or chloroform, we do not usually meet with violent symptoms; death may come on as gently as sleep. And some of what M. Tardieu would call spontaneous deaths, are attended with phenomena of extreme violence, as in our cerebro-spinal meningitis.

How sick Mme. de Pauw had been, or how long sick, it may not be easy to decide. The judge, mystified by the admitted fact that she was malingering, insists upon it that she was perfectly well. The most familiar character of malingering, as every practitioner knows, is the mere exaggeration of actually existing ailment. When the culprit ventures upon an original and entire falsehood, detection is usually easy. Thus Mme. de Pauw lied about a fall and consequent suffering from it, on which episode much is said during the trial, to little or no purpose. But she was seen and prescribed for by Velpeau, Nélaton, and several other physicians of experience, who all recognized the existence of gastric disorder. Dr. Goudinot, who saw her often, thought her so ill that he put her on a special diet—which she, however, disregarded—ordered her to stay in her chamber, and diagnosticated, by no means irrationally, perforation of the stomach as the cause of her death. We feel a degree of indignation, after

all this, at the partial magistrate who, in his ignorance of the nature of these medical observations and opinions, persists in declaring that the deceased had been in full health at the time of her attack; but we regard it as absolutely unpardonable in M. Tardieu to treat with such utter contempt the distinguished gentlemen who had examined and advised the invalid, as to repeat, dwell on, and found important inferences upon their assumed error or carelessness. Further, his assertion that all the organs of the body were in a perfectly sound state demands examination. Suppose the fact to be so, was it fair, was it correct in him to lead the jury to the belief that this afforded any ground for the suspicion of poisoning? Some poisons leave distinct traces, others none that are clear or palpable. There is no absolute rule here. But let us look into his statement. The autopsy was performed thirteen days after death. "The body was in perfect preservation, no decomposition had taken place; the integrity of the vital organs was entire, there was no lesion whatever, no injury; the blood was half coagulated, semi-fluid, with no clots. Only in the intestine we saw some 'sanguine' suffusions scattered in spots, *such as we meet in cases of poisoning*"—a most unfair insinuation as introduced here, and felt to be unfounded, for he goes on—"but in cases so varying that they can have no significant importance." But in the mere suggestion, to an uninformed and susceptible jury, the mischief was done. There was manifestation of early pregnancy, "valued at seven to eight weeks," a matter most strangely neglected in the description of a fatal case of gastric irritation, so often the result of uterine sympathy. Is M. Tardieu justified, on his own premises, by his own description, in his pointed conclusion that, "in the absence of all disease capable of causing death, there was involved the necessity of searching for a cause apart from spontaneous disease?" The "suffusions sanguines," which he coolly speaks of, "such as we meet in cases, of poisoning," how did they differ from such as we meet in cases of cholera, diarrhœa, indigestions? And when we meet with them in such cases, are they not indicative of "disease capable of causing death?" Let it be observed that we do not say that M. Tardieu was wrong in his conclusions, but we maintain that he arrived at them by illogical and indirect routes, which in similar cases it will be very dangerous to follow, and therefore, and because of his high authority, we protest against his course. By his positiveness and dogmatism, joined to remarkable fluency and facility of discourse, he, from the beginning, takes possession of the judge and the jury, and misleads them by affirming "the necessity of assuming some extraneous cause of death," thus begging the whole question.

He continues, and now we follow him upon his own special ground, as the most eminent toxicologist of the day. He resorts next to experiment, and from the results derives strong confirmations of the views he had been led to entertain. A dog dies after subcutaneous injection of the matter vomited by Mme. de Pauw; another treated in the same way with fluid from the stomach is very sick and recovers; and the symptoms observed in these two cases resembled those suffered by the deceased; and, lastly, "they resembled the observed effects of digitaline."

On the authority of Roussin, to whom the analysis was committed, and by whom it was fully and satisfactorily made, he asserts the absence of every form of mineral poison in the body. He acknowledges and dwells upon the difficulty, in the present state of science, of detecting many of the most virulent vegetable poisons, but proceeds with his characteristic skill and ingenuity in the obscure inquiry. He tells us, with apparent simpli-

city, that "in the subsequent experiments on living animals they were not guided by any preconceived idea," but admits that "they had read the documents prepared for the accusation," in which certain articles are definitely, nay, impressively mentioned, and, as we shall see, had obviously "made up their minds." The method followed was this: Scraping up what they could find of the matters vomited by Mme. de Pauw over the bed and parquet, they made an extract of them, which they introduced under the skin of the dog's thigh. The animal soon became unquiet and troubled; the heart-beats, 112 in a minute, previously showed themselves hurried and tumultuous; then they became progressively slower and slower—80—70—finally falling to 40. Nothing was given into the stomach, yet vomiting came on, abundant and frequent. The animal grew cold and was thirsty, "under the influence of the *poisonous extract* we had injected." The very language employed here announces a foregone conclusion; the extract is characterized as poisonous; it was made therefore of poisonous matter; but this matter came from the stomach of the sick woman; therefore she was poisoned, an inference strengthened by the alleged similarity of the symptoms in the two cases.

But we suggest that the inference, though *prima facie* highly probable, must not be hastily or peremptorily drawn. Let it be noted, that if the woman was murdered it was by some poison taken into the stomach. The dog died after inoculation or hypodermic injection. Now, M. Tardieu knows, and so does every toxicologist, that there is a very large number of poisons which act in one mode of administration with deadly efficiency and are perfectly innocuous in the other. This is true both of animal and vegetable poisons. The venom of the rattlesnake is harmless when swallowed; so are the terrible compounds used by savage tribes in the chase. The Bushmen try with their tongues the strength of the fluid in which they dip the points of their arrows. Next, they treated a second dog as they had done the first, but with an extract made from the stomach of the human "cadaver." This animal also showed himself unquiet, was enfeebled, and vomited. He ultimately recovered, having been "manifestly poisoned," but resisting a feeble dose of the poison. The pulse in this case was at first 102, but fell in five hours to 55. Having arrived at the conjecture or suspicion that digitaline was the agent employed, they make some experiments with it; but, strange to say, and most unaccountably to our mind, they select as the subjects of these observations an entirely dissimilar class of creatures. Exposing the hearts of three frogs, they inserted digitaline under the skin of the thigh of one; some of the extract of the vomited matters was employed in the second; the third was let alone. Nothing happened to this last; the two former died in twenty-eight and thirty-one minutes, the heart-beats gradually diminishing until they ceased. They conclude: "It is evident to us that Madame de Pauw, in whose case there existed no natural cause of death, could only have died poisoned—'n'a pu succomber, qu'empoisonnée.'" (p. 129.) As to the nature of the agent, "we have admitted that the poison was probably digitaline." We are very much at a loss to understand—1st, why they did not introduce some portion of their extracts of poisonous matter, whether gathered from the scrapings of the floor, &c., or by steeping the stomach or intestines of the cadaver, into the stomach of one or more dogs; 2d, why they did not repeat, with a larger quantity of the extract used, the experiment tried with partial results upon the second dog; 3d, why they did not make some experiments on the introduction of digitaline into the stomach, or under

the skin of some dog or other animal whose organization and susceptibility may be supposed more closely to resemble those of man than do the characteristics of the reptile and amphibious tribes. We shall have to return by and by to some of these points.

"My task is ended," exclaims, at last, M. Tardieu; "for you (the jury), as for me, it is perfectly settled (constant) that chez Madame de Pauw there was no malady capable of causing death." Is this language scientific, correct, precise? If she did die, as he supposed, from taking digitaline in large dose, was it not the direct effect of this agent to produce a "malady capable of causing death?" In leaving no visible trace, no lesion, many of the causes of disease not usually spoken of as poisons, and neither visible nor tangible, resemble it. She was, as he elsewhere admits, "in a nervous state of existence, not very easy to recognize after death; in conditions very favourable to palpitations of the heart. There was 'chez elle' an impoverishment of the blood." Are not these contingencies capable of causing death? She complained of suffering from her stomach. Nélaton, Desormeaux, Danet, and Velpeau agreed that she was dyspeptic. But Tardieu objects that the organ was perfectly sound; "I had it under my eyes," he says.

We have already intimated the manner in which they were led to suspect digitaline to be the drug administered. "Justice had not hidden from us the circumstances of this affair. Among the numerous poisons found in the possession of the accused, this had attracted special notice." But as there is one important deficiency in their series of experiments, the omission, namely, of a positive trial of the suspected article in a relevant way, so, in the enumeration of the symptoms in the case of Madame de Pauw, some of the most ordinary and certain effects of digitalis are not mentioned at all. "All physicians have seen digitalis," says M. Tardieu, "even in moderate doses, produce vertigoes, embarrassment of the head," &c. (p. 131.) She seemed to enjoy to the last an entire clearness of intellect; confident in La Pommerais and his prognosis, she did not doubt that she would soon be relieved; gave directions as to her children, and conversed, though languidly, with those about her. "Sophie, j'étouffe!" she said when dying.

A juror asks a very pertinent question, though put into too narrow a form. He desires to know if, when death occurs by indigestion, the dejections have the characters observed by M. Tardieu; and "if vomited matters might not undergo (from the existing morbid condition) an alteration which would render them poisonous." M. T. had the hardihood to reply dogmatically in the negative; declaring that when indigestion "is mortal, it does not modify the quality of matters vomited;" nay, he goes a step further, and adds that "if the aliments do not contain poison, the dejections cannot contain it. If poison had not been given, the matters administered to the animals, subjects of our experiments, would have produced no alteration whatever." We need not offer any comment upon such teaching. The products of morbid action may be—nay, it seems reasonable to believe that they must be—morbid or noxious in some mode, form, and degree.

Another position laid down by M. T. seems to us also to admit of question. "I speak of digitaline, if it can produce poisoning by its functional qualities, it loses completely its physical qualities when it comes in contact with organic matters." Thus he accounts for the failure of toxicologists to isolate it, as well as other vegetable extracts, and demonstrate their presence. But his explanation is inconsistent with his previous doctrine. If there is no surplus vegetable poison ejected among the matters vomited

by the sick person, there will be no alteration in the health of the animal experimented on, for there is no morbid change in the quality of the matters themselves; and if there is such a surplus, it should be detected by its physical qualities. Indeed, Roussin tells us that one of these physical or functional qualities, it is difficult to separate them absolutely, was found in the extract made from the matters vomited and scraped from the floor: "its excessive bitterness was striking." No success followed the attempts to detect the precise agent which, by an odd application of a law phrase, he calls the "*corpus delicti*," and goes on to inform us that "digitaline, in its commercial purity and in the same amount in which they obtained it (but they do not claim to have obtained it at all, in any amount, pure or impure), could not be recognized or characterized by the chemist in his laboratory, nor in any other way than by physiological experiment." The accused here puzzles them with some questions, not easily answered, about poisons, and how they are to be defined; and the judge is merry and makes the court laugh at the intimated possibility that hot bread may act as a poison. But hot bread has more than once been found guilty of "producing a malady capable of causing death"—a fatal fit of indigestion.

An undue stress is laid, we think, by all parties, upon the preservation of the body of Mme. de Pauw for the thirteen days between her death and the autopsy performed. More strikingly is this alluded to by M. Tardieu, in reference to the remains of Mme. Dubizy, mother-in-law of La Pommerais, whom he is also accused of having poisoned two years before. We are told that "the organs were found, when exhumed, to have kept their very form intact; the heart had retained its colour and dimensions, and so also the stomach and intestines." The brain, however, was "nothing but an *amalgam of matters*; the lungs reduced to thin *lamina* or plates, *des lamelles tres-minces*"—phrases difficult to translate. "The liver and kidneys were intact, presenting nothing remarkable." (p. 135.) But when they attempted to lift out the organs for analysis, they met with a "particular difficulty." Transformation had taken place into a fatty (*graisseuse*) matter, which degeneration rendered analysis perfectly null. In treating with ether, the entire organ disappeared, dissolved by this agent. It was probably adipocire, such as we found many years ago in the crania dug up from a spot used as a burial-ground for Hessians in the revolutionary war; the brains thus changed having lain in the earth half a century.

M. Hebert, a young pharmacien, who displays throughout his whole testimony no little ability and erudition, notwithstanding that he is taunted and bullied by both the advocate-general and the judge, in commenting upon the alleged preservation of both the bodies, falls, like M. Tardieu, into a hasty generalization. The latter, in his adroit way, makes his astonishment at the fact serve to convey the idea that it is owing to the specific qualities of some powerful agent, as if all poisons counteracted putrefaction. Hebert, combating this vague and blind inference thus dimly suggested, affirms, on the other hand, that while mineral matters, arsenic, lead, zinc, &c., are thus conservative, the directly contrasted quality belongs to organic or vegetable agents, which, he says, "have a marked tendency to promote decomposition of other organic matters." But he forgets that sugar and honey, vinegar, and pyroligneous acid are among the best preservatives of organic matter; so of wine, also, as well as alcohol. He seems to hint, for the benefit of the jury, that the unchanged condition of the body is incompatible with the presence of a vegetable poison. We object to both these experts that they "went beyond the record." Whether the preserva-

tion of the organs was or was not unaccountable otherwise, it is clear that neither of them has the right to draw any such inference from it as the presence or absence of any known or unknown specific agent. Hebert suggests, and we think fairly enough, the possibility, as meriting scientific consideration, that the extracts injected under the skin of the dogs experimented on may have been poisonous by putridity. We are disposed to make a difference in the two examples. While, with Hebert, we do not clearly know the cause of death in No. 1, and of sickness in No. 2, we think the first *may* have suffered from the noxious qualities of the bitter and foul matters vomited by the dying woman. Again, we regret that some of the "monticules" described by Roussin as gathered on the spot had not been administered to another dog by the mouth and stomach. But No. 2 was subjected to the introduction of extract made from the diseased and "well-preserved" stomach and intestines steeped in alcohol. The question is whether there may not have been here some poisonous matter, never detected as yet, never isolated, never demonstrated. Is it scientific, is it safe to affirm, as M. Tardieu broadly does, that "there is no form of decomposition or putridity capable of determining, in the organs, an alteration, such as that the use of these matters could lead to grave accidents?" We know that sausage poisoning occurs when the articles are apparently sound and pleasant to the taste and smell; and, besides these "saucisses and boudins" referred to by M. Hebert, we are familiar in Southwestern America with poisoning by milk, butter, and cheese, seeming sound and wholesome, which we ascribe, perhaps not with absolute certainty, to the disease in the cow, called "milk-sick." Roussin more prudently and plausibly takes his stand on the mode of preparing the extract by alcohol at a high temperature. But we say still that it remains to be proved that there exists no poison—that animal putrefaction develops no poison which will not refuse uniformly to be taken up by alcohol, or which will not uniformly be deprived of its noxious power by being thus dissolved. At this point of the trial, Hebert, being pressed very hard on all sides, enters into some rather irrelevant discussion concerning decomposition and putrefaction, and alludes to the frequently observed instances of safe ingestion of matters into the stomach which are fatal if inoculated. A fly, for instance, puncturing the skin of a healthy person after having fed upon an animal diseased with glanders, charbon, or farcy, communicates a fatal malady, while the flesh of such an animal may be eaten with impunity; going on to cite experiments made at Alfort, and asserting that all hygienists know that the peasants of villages in the neighbourhood of that institution "consumed for food the flesh of horses dead of farcy and glanders, without any inconvenience."

This occasioned a great sensation. M. Tardieu loudly "protests, in the name of his colleagues of Alfort as in the name of humanity, that never—*jamaïs de la vie*—did there go forth from the School of Alfort, for human consumption, such products of disease—*des produits altérés*. It was upon pigs that experiments were made; but the peasants in the environs of Alfort have never eaten the flesh of animals dead of *farcin* or *of morve*." (p. 148.) Next Professor Bouley, of Alfort, exclaims, "with great energy, "We give the lie—*donnons le dementi*—most formally to the assertion absolutely calumnious of M. Hebert; it is a lie such as was never uttered in a court of justice." Hebert in vain disclaims his having charged the Professors at Alfort "with having distributed this flesh;" the presiding judge declares that it was never done, and that "the authorities would certainly

have been informed of and would not have suffered it." The *avocat-general* asks the jury scornfully "what they must think of a man who has advanced against the Professors of the School of Alfort a recognized calumny."

After all, *what will our readers think* when we tell them that M. Hebert's statements are literally true, and that they are proved to be so upon the testimony of M. Tardieu himself?

M. Lachaud, referring to the harsh treatment inflicted upon poor M. Hebert, speaks as follows: "When he wished to point out to you the differences which exist between bad alimentation, a foul matter introduced into the stomach, and prickings on a limb, he recited the fact that the peasants in the neighbourhood had eaten of the flesh of animals dead of glanders at the School of Alfort, and had not been made sick by it. Upon that arose a grand tumult: 'he has caluminated the School of Alfort! It is incapable of feeding in this way its neighbours!' I well believe it; such an atrocity should never be seen. It was seen, however, but in evil times! The allied armies [it is true that we were not forced to feed them well]—which had with them many sick horses, ate them for want of better; and the School of Alfort had killed, in 1814, at St. Germain, two or three hundred horses, ill of farcy and glanders, which the inhabitants ate. It is M. Tardieu who gives us these statements in his *Dictionary of Health and Public Hygiene* (Dictionnaire d'hygiène public et de salubrité, vol. i. p. 427).

"It does not seem that the flesh of sick horses possesses any qualities different from that of sound horses. Three hundred army horses affected with glanders were taken to St. Germain, near Paris, and killed; they served for several days for the subsistence of the poor of the city, without their suffering any indisposition. The same thing happened some years after, in the wood of Vincennes, where the Professors of the School of Alfort caused to be conducted and killed a great number of horses attacked with farcy and glanders. The inhabitants of the neighbouring villages ate them as long as they were brought there; no disease appeared among them. Let us say simply that this happened in 1814. M. Tardieu is not the only one who gives an account of it; M. le Docteur Levy, a man of distinction, has told us the same story. I have read M. Tardieu, as more brief and more direct to our purpose." (p. 201.)

We are sorely tempted to follow Messieurs Tardieu and Roussin into the general investigation which they conducted with so much skill and ability, but this would be to imitate the very errors which we would wish to point out in their course. They did not confine themselves within their proper functions, and we would offer their mode of proceeding as an example to be shunned, not followed. "They acted in this affair," says M. Lachaud, "not only as men of science, 'savants,' but at the same time, they will permit me to say it, like advocates-general. They did this openly, they did not hide it. Ordinarily the usage is this: you give a cadaver to a physician; he opens and examines it, and reports to you the results he has obtained. You give him certain matters which he is to submit to chemical experiment; he makes his experiments and arrives at results which he gives you to know. Here the experts have indeed proceeded upon a cadaver; they have duly made their chemical observations, but, they avow it, it is in the written documents of indictment that they have found the complement of their convictions. This is so true, that their report concludes like an act of accusation." "They read the letters; they examine

the simulation of the pretended malady; they peruse the depositions of witnesses, indeed all the papers in the case; and it is with these elements—which do not belong to their science—that they form their conclusions.” Such are their sins of commission; we have already attended to their sins of omission. A word more concerning one of these. At a late stage of the trial this had become a matter of such prominent remark, that the presiding judge recalls Messrs. Tardieu and Roussin to explain why they had not experimented directly upon some animal with digitaline, the article to which they attributed the death of Mme. de Pauw. After much irrelevant declamation, M. Tardieu, who speaks for both, utters the following sophistical reply:—

“There are reasons, capital, decisive, why these experiments can bring to-day no new proof. First, our conviction was settled; it subsists entire and complete. But a determining reason is this: it is not a question of sentimentalism. They have told you that we did not wish to sacrifice another animal; but that is not serious. One determining reason is this: if you give a dog digitaline by the throat, this substance will be immediately vomited; and then, if you wish to make a serious experimentation, you must, like all the authors who have studied the effects of poisons on dogs, recur to a preliminary operation, which consists in tying the œsophagus of the dog as soon as the poison is administered. This is what Orfila did in his experiments, and they reproached him for it. The operation has been warmly attacked in a learned discussion which took place at the Academy of Medicine; it has been formally condemned. Setting aside the poison given, the ligature may kill the dog. It is thus struck with nullity, and signifies nothing. I am no conjurer, but I certify that if we had done that, they would have said to us, “‘Your animal is not dead of what you gave it; it is dead of the ligature; for see here, in the bulletin of the Academy, such a fact relative to the operation;’ and we would have had nothing to answer.” We are pained to encounter a specimen of rhetoric so far below the reputation of the Dean of the Faculty. M. Tardieu has before told us (p. 128) that he chose the dog as the subject of experiment because, like man, he vomits, but does not vomit easily. Mme. de Pauw did not have her œsophagus tied. It was idle for him to say, as he did (p. 206), that to administer digitaline pure to a dog, would be to expose ourselves to this—that the poison would be at once rejected without having produced any other effect than vomiting; it would be a null experiment. We are not given to sorcery, but we are ready “to certify” that digitaline, in proper dose and mingled with some food, will kill a dog, whether his œsophagus be tied or not.

Such minute and extended investigation of the character and effects of digitaline took place during this long trial, that we have a right to expect valuable light to have been thrown upon the subject. Much difference of opinion having arisen, and frequent reference having been made to Claude Bernard as the highest authority on such questions, the court very properly sent for him, evidently regarding him as a sort of umpire, from whom there was to be no appeal. We begin, therefore, our collation of views concerning this very efficient and dangerous drug with his testimony. “I have occupied myself with digitaline and poisons analogous in effect, which they call ‘poisons of the heart.’ There are many such, the upas antiar, green hellebore, the vao, &c. &c. Under their influence the movements of the heart are arrested, and life ceases among the higher classes of animals. In such I have seen digitaline cause, in general, some agitation, vomitings often;

the dog, for example, lies panting, and after a certain number of hours, varying with the dose, succumbs, and dies as if by syncope. We usually find in making the autopsy immediately after death, that the heart is arrested (*arrêté*); there is some red blood in the left side of the heart, bright like arterial blood, but on the right side it is black; this is because the heart is arrested before the animal has ceased to respire. It is the arrest of the contractions of the heart which causes death. The heart ceases its action, distended; the cavities are full, and soon, much more rapidly than ordinarily, the heart falls into a state of complete rigidity; the ventricle becomes white and hard (*blanc et roide*); the auricles remain full a longer time." The judge asks, "'The heart is contracted?' C. B. 'It becomes contracted very rapidly, but at the instant of death it is not. All the poisons of the heart have the same character; if we open the animal poisoned, at once after death, the heart contains some blood, but some time after it contracts itself and becomes white and hard.' The judge persists: 'Consequently, a little time (*peu de temps*) after death, contraction of the heart exists?' C. B. 'Yes, for the ventricles.'" This is not more satisfactory to the judge than it is to us. He asks again: "'Ten minutes—six minutes—after death, has the *contraction* ceased, or does it still exist?' C. B. 'The heart-beats cease at the moment of death? *rigidity* comes on, for example, after a quarter of an hour.'" Now we have a very important question, and, as it seems to us, a very unsatisfactory answer: "'Is it this rigidity that you name contraction?' 'No; contraction is the closing (*resserrement*) of the heart, functional and transient.'" But he has just spoken of contraction after death! The judge then inquires, "'Rigidity, however, follows contraction?' C. B. 'But then the contraction is permanent.' 'Consequently,' says the judge 'ten minutes after the death of an animal which has taken digitaline, the rigidity resulting from the contraction of the heart persists?' C. B. 'When it has come on, it persists fixedly.'" The judge repeats, "'Consequently, there is no relaxation of the heart?' C. B. 'There are two things to be clearly distinguished. When the heart stops, it is in the state of relaxation; and very soon afterwards, sometimes at the end of ten minutes, the relaxation has ceased; there is contraction in the ventricle.'"

This distinction between contraction and rigidity seems somewhat *fine*, but is earnestly accepted by the ready M. Tardieu, who, when asked by the judge if he agrees with M. Bernard, answers, "Absolutely." He *meant* cadaveric rigidity when he employed the word contraction. "Contraction" is, to speak properly, the action of contracting itself, which cannot persist after death. We give the original, lest any one should suppose we caricature in translating: "Le mot de contraction est impropre, puisque la contraction est, a bien dire, l'action de se contracter qui ne peut persister après la mort." (p. 160.) "Digitaline, a heart-poison, manifests its action by the abrupt arrest of the heart, and by the very prompt and persisting rigidity of the organ." We do not wonder that the unhappy judge, confused as we confess ourselves to be by their nice variations of meaning attached to the words contraction and rigidity, permanent and transient, and cadaveric rigidity and toxic rigidity or that from digitaline, avows his ignorance of legal medicine and his liability to use incorrect terms, but holds firmly to the point "that relaxation of the heart does not exist (*n'existe plus*) after death." And the confusion is worse confounded by M. C. Bernard adding, "the rigidity comes on very rapidly; there is no relaxation *some time* (*quelque temps*) after death." Hebert, who is accused

of having said that there was relaxation after death from digitaline, now "begs permission to ask one question of his thrice-honoured master, M. Bernard: Has he examined the heart two hours after death?" And his thrice-honoured master replies in phrase which bears such strange meaning in the original that we will not venture to translate it entire. "Two hours seem to me *un temps assez rapproché*, a rather short interval; very often, most frequently indeed, in ordinary death, the heart is not retracted (*rétracté*) after this time, that is to say, rigidity has not yet supervened (*c'est-à-dire, que la rigidité n'est pas encore survenue*). In a dog, under ordinary conditions, the heart-beats continue still after death, sometimes a half hour, sometimes three-quarters of an hour, according to circumstances; the heart remains full of blood, rigidity does not come on until late. What characterizes the effects of digitaline is, that it brings on sooner that which would happen naturally, but later." A very "lame and impotent conclusion."

The oracle has now spoken. We have heard the authoritative words of the master; what say the rank and file of physiologists, what do the disciples believe? Hebert has collected and quoted; we extract from his testimony. "All therapeutists and physicians agree that digitaline, taken in small dose, retards or renders slower the beats of the heart. But when taken largely, it acts differently; there is, on the contrary, acceleration of the heart-beats. In poisoning by digitaline there is not contraction of the ventricles, but, on the contrary, relaxation of the cavities of the heart." (p. 144.) He affirms this to have been proved by the Professors of the Alfort School, Bouley and Reynal; he names Delafond, and Dupuy, and Quevenne, and Stannius, and Bouchardat, and Homolle. (p. 161.) Even Bernard admits that "often there is acceleration of the respiration and equally of the circulation at the beginning; but retardation soon comes on, and the heart dies, beating more and more slowly." (p. 161.)

Professor Vulpian has experimented on frogs only. He found a few substances entitled to be considered heart-poisons: digitaline, the venom of the toad and the water-salamander, tanghai, green hellebore, and the upas antiar. "Digitaline being introduced under the skin of the thigh, ten minutes would pass without change; then the heart would undergo marked modifications; the auricles would move incompletely, the ventricles contract less regularly. After a few minutes more the ventricle would stop, become white and contracted, the auricles dilated." (p. 162.) Bouley's experiments were made with digitalis upon horses. "Intoxication with digitalis produced at first excitation, and the heart-beats were accelerated. But when the effects of the poisoning were complete—when the poison passed into the blood, and the impregnation was general—a notable retardation took place in respiration and in the pulse, so that it fell from 38 or 40 to 20 or 22, and the respiration from 12 to 4 or 5 in the minute." "The blood of a horse poisoned by digitalis is extremely diffuent—'poisseux,' pitchy. The heart became *tres flasque*—very flaccid; there was no rigidity. I repeat, this is constant with the herbivorous animals." The judge asks M. Tardieu, "What have you to say on the subject of this flaccidity?" The reply is more ingenious than frank: "M. Bouley has explained it. It depends in part upon the period at which the autopsy has been made; we find analogous effects even among the carnivores, when the autopsy has been deferred; and in part upon the special nature of the herbivorous tribes, and the flaccidity of tissue which is proper to them."

Stannius had experimented upon a young cat, a carnivorous animal.

"Ten minutes after the autopsy (sic) the contractions of the left ventricle, until then spontaneous, ceased, not to reappear even by means of electricity." (p. 162.) In another experiment, "six minutes and a half after the injection the thorax was opened. The heart beat no more; all its cavities were in a state of relaxation, distended, and gorged with blood." In the autopsy of Mme. de Pauw, "the results were absolutely negative. The heart had the dimensions which are found in the most normal condition." (p. 147.) In the dog killed by injection of the extract, "the ventricles of the heart were contracted most evidently, while the auricles were dilated. All the cavities were filled with a black blood, thick and partly coagulated; the organ presenting a 'deformation,' and a species of turgescence very visible." (p. 144.)

Tardieu quotes from Taylor a detail of "the dominant symptoms in poisoning from digitalis: incessant vomitings, intolerable pains of the head, retardation of the pulse." We fear that the professional testimony and discussions presented during this trial have not enriched our medical jurisprudence by any very clear or valuable addition to our knowledge of the influence, symptomatology, or pathology of vegetable poisons.

But we must conclude. M. Lachaud's able and ingenious defence establishes upon the most positive evidence the previous ill health of Mme. de Pauw, concerning which M. Tardieu had gone out of his way to urge an erroneous view upon the jury. The real increase of her indisposition, concurring with her efforts at deception by falsehood and malingering, is traced from Desormeaux's mild prescription of morphia, &c. (Oct. 13), through Nélaton's small and Velpeau's large "vesicatoire," and Danet's "tartre stibé," to Gaudinot's serious consideration of her case, and the impression made by her appearance upon Mmes. Gonehon and Maille on the 9th and 12th of November. On the 10th, Dr. G. found her so ill that he ordered her to keep her room and observe a strict diet; on the 16th the fatal attack supervened.

M. Lachaud dwells with proper force upon the fact that Mme. de Pauw never spoke of anything having been administered to her by La Pommerais, though she saw and conversed with Drs. Gaudinot and Blachet, her daughters, and five other persons, and mentioned the visit of La P. on the evening of the 16th. She died on the evening of the 17th, without hinting any accusation against him. "Do you comprehend this silence?" he asks emphatically. It deserves notice, too, that no phial or vessel that seemed to have contained any drug, nor any other trace of anything having been taken, was found in her chamber.

He comments with respectful severity upon the attitude of M. Tardieu throughout, as having pleaded earnestly and powerfully the cause of the prosecution. "He was adroit enough to profess to agree with M. Bernard even when they were entirely opposed; and even when they seemed to accord with one another, as in the suggestion of digitaline as the cause of death—'Ne contrarie pas,' the phrase thrice used by M. Bernard, does not mean 'tres-probablement,' *very probably*, as rendered by Tardieu."

We cannot but think that too little attention was paid to the pregnancy of Mme. de Pauw. The Dean of Faculty, as usual, took occasion to lay down certain general doctrines. He was perhaps right in affirming that "when a pregnant woman dies, it is oftenest at the end of her term;" but he is wrong in asserting, as he does gratuitously, that "it is always a sudden death." The sympathetic irritation of the stomach is in some subjects very severe even in the early months, and might have greatly aggravated

the symptoms of such gastric embarrassment or dyspepsia as all her medical advisers recognized in her case. As to the uniform suddenness of death resulting from the peculiarities of the pregnant condition, we have vividly in our recollection two victims of the irritation alluded to above, which progressed slowly from bad to worse for months, wearing them out by vomiting and diarrhœa; and in others we have known this persistence to require relief by the reluctant resort to forced and premature labour. But we will not argue these points with M. Tardieu, who should not have so often "travelled out of the record" to pronounce opinions uncalled for, but always bearing so much weight of authority, both from his distinguished ability and his elevated position, that they should never be carelessly uttered, nor can they be passed by without respectful and serious examination.

S. H. D.

BIBLIOGRAPHICAL NOTICES.

ART. XXIII.—*Fourteenth Anniversary Meeting of the Illinois State Medical Society*, held in Chicago, May 3, 4, and 5, 1864. Chicago, 1864. 8vo. pp. 156.

THE first article in the Transactions is the "Report of the Committee on Practical Medicine," by Dr. N. S. DAVIS, of Chicago, which contains an interesting notice of an epidemic of *erysipelas*, that prevailed in Chicago during the six months preceding March 1, 1864. Twenty-one cases were admitted into the medical wards of the Mercy Hospital. In nearly all, the disease commenced with rigours and the other ordinary symptoms of continued fever, and some soreness of fauces. At the end of from one to three days the erysipelatous inflammation appeared upon the face, usually about the *alæ nasi*. In a few cases it commenced at the lobe of the ear. It spread rapidly over the face and scalp, occasionally, also, down the neck to the upper part of the trunk. There was usually much tumefaction of face, with extensive vesications. In three cases suppuration occurred in the tissue of the eyelids. The patients for the most part belonged to the poorer classes; they had been labouring under the disease some two to five days before admission. The fever was of a decidedly typhoid type; pulse frequent, soft, and quick; skin dry; inflamed surface, and fauces dark red; mind dull, and sometimes wandering; tongue had a reddish-brown coating, inclined to be dry; urine dark and scanty; bowels easily moved; stomach, sometimes, but not generally, irritable. In four of the most severe cases there were frequent stools of a reddish-brown character. In fourteen of the cases the recovery, after convalescence, was rapid and unattended with any unpleasant sequelæ; in the remaining seven it was tedious. In two there were small cellular abscesses in the eyelids; in one there was a very protracted otorrhœa, with partial deafness and giddiness; in another there occurred three distinct relapses or recurrences of the disease, the erysipelatous inflammation involving the face, ears, and mastoid spaces. None of the cases terminated fatally. Of thirty-five cases treated at the same period as the above, in private practice, one terminated fatally on the eighth or ninth day, in a female child only four weeks old. The erysipelatous inflammation attacked the vulva and nates, from whence it extended gradually over the entire cutaneous surface. It was attended with both vomiting and diarrhœa.

The entire number of cases which occurred during the epidemic in Chicago could not be ascertained.

Various opinions were entertained as to the cause of the epidemic. By some it was referred to an impure and offensive condition of the Chicago River, which existed at the time, in consequence of its having been made the receptacle of a vast amount of putrescence and putrescible material. Careful and extended investigation showed, however, that the disease, in a sporadic form, was already present in the city before the water in the river had become corrupt, and that a similar form of *erysipelas* was of more than usual prevalence in several localities in the interior of the State. It may be inferred, therefore, that, while the bad condition of the Chicago River, and of the water supplied to families throughout the city, may have increased the prevalence and malignancy of the disease, it was not the primary cause of it. Dr. Davis believes that the disease was due to a wide-spread epidemic influence disposing to diseases of a decidedly typhus type.

"This view," he remarks, "is confirmed by the fact that, coincidently with the prevalence of *erysipelas* in Chicago, the typhoid, typhus, and puerperal fevers have been, also, unusually prevalent. During the six months ending

March 1, 1864, there were admitted into the medical wards of the Mercy Hospital fifty well-marked cases of typhoid fever."

During the same period there came under his care, in private practice, sixty-three cases of this fever.

"These figures," says Dr. Davis, "certainly indicate a numerical prevalence of typhoid fever in Chicago considerably above the average for a series of years."

From his own observations, and from information derived from other practitioners of the city, Dr. Davis is satisfied that true puerperal fever, also, was much more prevalent during the entire winter of 1863-64 than usual.

During the last half of October and the first of November, 1863, while erysipelas was most prevalent, and the water in the river with that supplied for domestic purposes throughout the city was extremely impure and offensive, there occurred a number of cases of sickness of an unusual character, the greater proportion of which terminated speedily fatal. The disease usually commenced with a harassing cough, some soreness of the air-passages, and a sense of great weakness or weariness. The pulse, at first, was not much disturbed, nor was the skin hot or dry. The patients were able to be up and dressed. After from three to six days, there occurred suddenly a feeling of great oppression across the chest, with great dyspnoea, rapid pulse, cool extremities, with a rapid accumulation of tenacious mucus in the air-passages. In several of the cases the dyspnoea and sense of exhaustion increased so rapidly that death from apnoea occurred in from eighteen to twenty-four hours. Several of the cases occurred in good families, and in females far advanced in pregnancy.

To the inquiry, what was the nature of this disease? Dr. Davis gives it as his opinion that it was a form of erysipelas, in which the inflammation attacked primarily the mucous membrane of the bronchial tubes, and subsequently extending by continuity to the air-cells, inducing universal capillary congestion of the lungs, and consequent suffocation. There were no post-mortem examinations.

In respect to treatment, the remedy almost exclusively relied on was the tinct. ferri chloridi, in doses of from twenty to thirty drops every two hours until the inflammation of the skin ceased to spread, then every three or four hours until convalescence set in.

In three or four cases in which, at the time of admission, there was troublesome gastric irritation, the treatment was commenced with alterative doses of calomel with morphia. In a few cases, moderate doses of quinia and opium were given at night to procure rest. Nourishment in the form of animal broths or of milk was regularly given. Tea and coffee were allowed, but no diffusible stimulants. Convalescence was established within a period varying in different cases from four to twelve days.

From the report of Dr. Davis we learn that during the winter of 1863-64, and the following spring, there occurred in different parts of Illinois a disease of rapid progress, and attended with a very high ratio of mortality, in regard to the nature of which much diversity of opinion existed. By some it was viewed as a specific inflammation of the meninges of the base of the brain and medulla oblongata, by others as a malignant form of scarlatina, and by others again as an affection identical with the "spotted fever" that prevailed so extensively in New England upwards of half a century ago. It seems to have occurred mostly in rural districts, and in the central and southern parts of the State. Its attack was not restricted to any class, sex, or age; although it would seem to have occurred most frequently among the young.

From the descriptions given by different practitioners, whose opportunities for observation were ample, it appears that the disease varied somewhat in its symptoms and course in different localities, and in different cases in the same locality.

There were, in general, no well-marked premonitions of the attack; occasionally, however, it was preceded by pain along the course of the facial nerve and at the back of the neck, with slight redness of the eyes and intolerance of light.

The course of the disease was, in the majority of cases, rapid. It would sometimes, however, continue for weeks, and then terminate fatally or in recovery. In most of the cases of any duration a decided periodical tendency was exhibited. In some districts epidemic erysipelas and the disease under consideration prevailed simultaneously.

This disease, called spotted fever by many, is usually ushered in by a chill, pain of head, neck, and extremities, rapid impairment of special senses, and of the strength. There is a frequent pulse, rigidity of muscles of neck, sometimes, also, of those of the jaws and extremities. Red or purple spots, varying in size, appear on the surface; great restlessness and jactitation and increased sensibility, with soreness of the surface, are generally present. Paralysis of the extremities sometimes occurs, at others convulsive movements. Stupor, rapidly running into complete coma, is often an early symptom. There is irregular respiration, with a very frequent or variable pulse; diminution or general suppression of the secretions, capillary congestion, or petechiæ; death often occurring within from six to twenty-four hours, but in cases of less severity not until many days or even weeks.

In examinations after death, in cases terminating fatally within a few hours, little or no structural change was apparent in any part. The blood was, in general, dark, and diminished in coagulability; the venous capillaries were generally more or less loaded with blood, especially in the brain and membranes at its base and posterior part. Sometimes ecchymosed spots appear on the inner surface of the larger bloodvessels. After more protracted cases, the meninges of the base and posterior parts of the brain are usually found intensely red, and the cerebral substance injected, often softened; these lesions are attended with effusion, both plastic and serous. The muscular tissues are darker in colour and softer than natural; the lungs are often passively engorged; the kidneys exhibit, in many cases, indications of fatty degeneration, or the accumulation of fat-globules in their cortical substance. The urine is often found to be albuminous before and after death.

The treatment which was found most beneficial consisted in active rubefacients along the entire course of the spine, as frictions with a saturated solution of camphor in spirits of turpentine, blisters to the back of the neck and head, warmth to the extremities, attention to the state of bowels, alterative doses of mercury, in conjunction with camphor, valerian, ipecacuanha, nitre, etc., and in a few cases quinia, especially at an early stage of the attack, and in cases exhibiting a tendency to periodicity. By some, quinia in large doses, combined with full doses of morphia, is reported to have been the most successful remedy. Brandy, wine, and the spirits of nitrous ether were well borne by the patients. Generally all such measures as had a tendency to support the strength, and stimulate the nervous centres, with decidedly revulsive agents, appeared to be the most successful remedial means at the onset of the disease; in cases, however, of any duration, a more alterative and less stimulating course of treatment was demanded. Iodide of potassium, stillingia, iodide of iron, mercurials, and conium, belladonna, hyoscyamus, etc., were all employed, but sometimes without benefit. Counter-irritants, freely employed, were always highly beneficial throughout the disease. Sedatives were not found to act well. Bloodletting was tried, but with no benefit, rather with harm. The effect from cold applied to the head was rather doubtful. Strychnia was resorted to in the latter stage of some cases, with the view of relieving the general or local paralysis constituting one of the sequelæ of the disease, and with ordinary benefit.

The report of a special committee "On Diseases of the Eye," prepared by Dr. E. L. HOLMES, Lecturer on Diseases of the Eye in Rush Medical College, and Surgeon to the Chicago Eye and Ear Infirmary, presents a list of the diseases of the eye which have fallen under the observation of the reporter during the past eight years, but principally during the last five years, arranged in thirteen classes: 1. Those of the conjunctiva, comprising 1,128 cases. 2. Those of the cornea, comprising 305 cases. 3. Those of the sclerótica, comprising 49 cases. 4. Those of the eyelids, comprising 217 cases. 5. Those of the iris, comprising 113 cases. 6. Those of the choroid coat, &c., comprising 98 cases. 7. Those of the retina, comprising 135 cases. 8. Those of the lens, comprising

84 cases. 9. Those of the globe of the eye, comprising 27 cases. 10. Those of the muscles of the eye, comprising 45 cases. 11. Those of the lachrymal appendages, comprising 32 cases. 12. Those of the accommodative apparatus, comprising 48 cases. 13. Those of the orbit, comprising 8 cases. Making in all 2,289 cases of eye affections.

This table is supposed to present the relative number of cases of each disease of the eye and its appendages, as met with among eye patients in the Northwest.

We find from the table that diseases of the conjunctiva form by far the largest class of eye affections which fell under the reporter's notice, comprising nearly one-half of all the cases treated. To this class might be added a large portion of the diseases of the lids and cornea, inasmuch as they are so often mere sequelæ of conjunctivitis. There is reason to believe that the loss of sight in a large portion of the blind throughout Illinois is to be attributed to neglected or maltreated inflammation of the conjunctiva.

The cause of this extensive prevalence of conjunctivitis throughout Illinois is in general referred to the prevalence of a dry atmosphere loaded with dust. This has been denied by some, who, in proof of their dissent, point to the occurrence of epidemics of conjunctival inflammation at times when the prairies have been covered with moisture. It is certain, Dr. Holmes remarks, that few places experience more violent winds and a more dusty atmosphere than Chicago, and yet epidemic conjunctivitis is not known in that city.

The general remarks made by the reporter in reference to various points connected with the pathology and treatment of a few of the leading ophthalmic diseases are interesting and instructive; they present, however, no very prominent points demanding special comment.

The paper on "Cerebro-Spinal Meningitis, as observed in Morgan County, Illinois, during the years 1863-64," by Dr. McVey, describes the disease as commencing with a chill, followed by intense febrile excitement, great restlessness and moaning, suffusing of the eyes, dilated pupils, and delirium. The patient, when aroused, in general answered questions correctly. Sometimes the entire body was affected with a rapid succession of tremors; occasionally there was squinting of one eye. The countenance had a brownish hue. The tongue was at first slightly coated, but more thickly so as the disease progressed. There was constipation, vomiting of a dark grumous matter, and contraction of the posterior cervical muscles. In some cases the neck, back, and extremities were covered with petechiæ. The disease was known to terminate within six hours from its attack, without any febrile reaction.

Dr. McVey believes that the disease is due to some toxic agent in the blood, by which the vitality of the latter is impaired, as well as the contractility of the capillary and other bloodvessels of the brain, with consequent passive congestion of the latter organ. If reaction occurs, inflammation may set in, he believes, as a secondary condition.

The treatment pursued by Dr. McVey was, in cases marked by decided coma, tonic spasm, and pains of the limbs, back, and head, the administration of large doses of opium, from four to five grains to an adult, with Fowler's solution, from six to eight drops every four hours, the moderate use of alteratives, mild aperients to keep the bowels open, friction to the surface with tincture of capsicum and alcohol, turpentine to the spine, sometimes blisters to the nucha, and, where the muscular prostration was greatly prolonged, the administration of strychnia. Under this treatment, Dr. McV. had six recoveries out of nine cases, and his partner, Dr. Brown, sixteen recoveries out of twenty-one cases. He considered quinia, excepting in very small doses, to be contraindicated. After the violence of the disease has abated, however, he believes it may have a salutary effect upon the digestive organs, and raise the tonic of the system generally.

The report on "Orthopædic Surgery," by Dr. DAVID PRINCE, of Jacksonville, Ill., includes only that group of deformities of the feet known by the generic term *talipes*, postponing to a future report the consideration of the other groups of pedal deformities.

The reporter believes that the presentation to the profession of the latest advances made in this country and in Europe towards the correct treatment of

the deformities included in the present report, with the improvements introduced by himself, will enable every practitioner to cure every uncomplicated case of congenital talipes which may present itself, if its treatment be commenced during early infancy. Though not quite so sanguine in this respect as the reporter, yet we are persuaded that every practitioner will derive from his very full exposition of the subject many valuable hints in respect to the proper management of the deformities referred to. We regret that the space cannot be spared us to present an analysis of the report.

Some "Observations on Puerperal Fever," which appears to have been prevalent during the past year in some portions of Illinois, are presented by Dr. DELASKIE MILLER, of Chicago.

Dr. Miller denies that puerperal fever is due merely to peritonitis, metritis, phlebitis, or any other form of simple phlegmasia, but that it is the result of some toxic agent admitted into the blood—that it is truly zymotic, the lesions observed after death being consequent upon changes produced in the tissues by the morbid condition of the blood. The history of puerperal fever is conformable to the law observed by all poisons. Thus it is uniform in character. The description of it given one hundred years ago is equally true of the disease as it occurs to-day. The poison selects for its action a single tissue, namely, the serous and analogous structures; its specific action is chiefly upon the blood, increasing the quantity of its fibrin, and deteriorating it in quality; its action is modified by the quantity introduced into the circulation; it may enter to an extent sufficient to destroy life so suddenly as not to allow of time for the occurrence of any permanent lesions.

"It would be interesting," Dr. Miller remarks, "to trace this poison to its source, and examine in detail the mode of its communication, but we can do little more than state conclusions.

"1st It may originate within the system from the decomposition of organic matter.

"2d. It may be introduced from without, by exposure to diseases characterized by ichoræmia.

"3d. It may be communicated by the attendant, who becomes the vehicle of transportation from a distant case."

The method of treatment Dr. Miller indicates under three heads, viz: first, to neutralize the *materies morbi* in the circulation, the uterus, and the vagina; second, to eliminate the disintegrating and effete materials from the body; and third, to support the vital forces of the system.

To fulfil the first indication, Dr. M. recommends chlorine and bromine. These remedies, he remarks, are valuable in every stage of the disease, and are especially indicated when the discharges are profuse or offensive. Locally, they may be applied in solution or in the form of vapour. They should be introduced not merely into the vagina, but into the cavity also, of the uterus. Employed thus, with proper precautions, experience has shown them to be not only harmless, but highly efficient remedial agents. The plan is first to wash away all offensive discharges as fully as practicable, then to convey through a suitable tube to the parts indicated a proper solution of the chlorine or bromine, or the vapour of either, according to the choice of the practitioner.

The local use of bromine in the treatment of puerperal fever was suggested from its known value as a remedy in erysipelas, hospital gangrene, etc.

The *second indication* is to be fulfilled by the use of such agents as are believed to have the power of preventing or arresting the morbid influence of the poison already circulating with the blood—such as the mineral acids, salts of chlorine, the bromides, the sulphites of lime and soda.

To fulfil the third indication, anodynes are valuable, not to relieve pain and irritation, but, in full doses, to arrest rapid metamorphosis of tissue; tonics are indispensable, such as have been already enumerated as proper under the second indication. Nutritious diet is all-important, and in many cases stimulants also.

The "Report of the Committee on Surgery," by Dr. E. ANDREWS, of Chicago, comprises a very interesting series of statistics derived from the records of Mound City Military Hospital, under the care of Dr. H. Wardner, Surgeon U. S. Vols.

The general list comprises forty-five cases, namely: *Fractures of extremities*, 15 cases, including one of the clavicle; of these 7 were with amputation, 8 were discharged, 5 died, and 2 were returned to duty. *Fractures of skull*, 3 cases, of which 1 was discharged, 1 died, and 1 was returned to duty. *Fractures of bones of face*, 2 cases, of which both were discharged. *Injuries to extremities*, including one to scapula, 5 cases, of which 2 were discharged, 2 returned to duty, and 1 died. *Wounds*, 20, viz., of chest and lung 6, of which 3 were discharged, and 3 died; of *shoulder and neck*, 3, of which 2 were returned to duty, and 1 died; of *back*, 3 cases, of which one was returned to duty, and 2 died; of *descending colon*, 1 case, which was returned to duty; of *nates*, 1 case, which was discharged; of *lower extremities*, 6 cases, including knee-joint 1; one or both thighs, 4; foot, 1; of which 1 was discharged, and 5 were returned to duty.

Combining the foregoing with the statistics gathered from various Western battle-fields, we have the following:—

Gunshot fractures of cranium	11, of which 3 recovered, and 8 died.
“ “ face	17, “ 15 “ “ 2 “
“ “ shoulder-joint	6, “ 4 “ “ 2 “
“ “ humerus	35, “ 30 “ “ 5 “
“ “ elbow-joint	17, “ 14 “ “ 3 “
“ “ forearm	20, “ 20 “ “ 0 “
“ “ pelvis	2, “ 2 “ “ 0 “
“ “ femur	33, “ 17 “ “ 16 “
“ “ knee-joint	25, “ 9 “ “ 16 “
“ “ leg	32, “ 23 “ “ 9 “
Penetrating wounds of thorax,	32, “ 12 “ “ 20 “
“ “ abdomen	16, “ 4 “ “ 12 “
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	246 “ 153 “ “ 93 “

Two of the cases of fractured cranium which recovered were trephined to remove depressions. In all of the recoveries the skull was merely ploughed by the shot, the brain not being entered by the bullet.

From fractures of knee-joint only two cases of recovery, without amputation, are known to have occurred.

The following table gives the result of 87 cases of amputation, and 20 cases of resection:—

Shoulder-joint, amputation,	4 recovered, 2 died, total 6
Arm, “	14 “ 1 “ “ 15
Forearm “	5 “ 0 “ “ 5
Thigh, upper third, “	6 “ 4 “ “ 10
“ middle, “	4 “ 7 “ “ 11
“ lower third, “	10 “ 5 “ “ 15
Leg, “	21 “ 4 “ “ 25
Shoulder-joint, resection,	8 “ 2 “ “ 10
Knee, “	1 “ 0 “ “ 1
Along the shaft of femur, “	0 “ 2 “ “ 2
Elbow-joint, “	6 “ 1 “ “ 7

In the wars of Great Britain and France 44 cases of amputation at the shoulder-joint are reported, with 17 deaths. In the Schleswig-Holstein campaign 19 resections of the shoulder are reported, of which 7 died. Combining these and the above statistics, we have 50 cases of amputation at the shoulder-joint, with 19 deaths, or 38 per cent.; and 29 cases of resection, with 9 deaths, or 31 per cent.; showing an advantage of 7 per cent. in favour of resection.

Combining the cases of resection of the elbow-joint with those quoted by Esmarch, and comparing them with amputations of the arm, we have a total of resections of elbow-joint of 47, with 7 recoveries, or 15 per cent.; and of amputations a total of 87, with 69 recoveries, or 21 per cent.; showing an average of 6 per cent. in favour of resection of the elbow.

The comparative results in respect to mortality between good field treatment

in amputations of the thigh, and the treatment in average general hospital buildings is stated in the report to be nearly as follows:—

In hospital buildings mortality in amputations at upper third of thigh 85 per cent.; in the field, under good circumstances, 45 per cent.; amputations at middle of thigh in hospital 60 per cent.; in the field 30 per cent.; amputations at lower third in hospital 30 per cent.; in the field 20 per cent.

"It is gratifying," says the report, "that many of our military hospitals have been so far improved that they now rival the success of field treatment, and that upon the whole our present general hospitals are superior to any that have ever been constructed on so large scale in European wars. The essence of the improvement consists in the superior character of modern arrangements for ventilation."

In the Mower General Hospital, at Chestnut Hill, Philadelphia, these arrangements are particularly excellent. The consequence is, out of 6000 patients no case of hospital gangrene has occurred, and only one death from erysipelas. In short, in this hospital, gangrene, erysipelas, and pyæmia, the especial scourges of hospitals, have been completely disarmed of their terrors.

The concluding paper is "Some account of the prevailing epidemic in the northwest, variously designated, but usually popularly denominated '*Spotted Fever*,' by Dr. J. ADAMS ALLEN." It appears that for some years previously to May, 1864, the so-called spotted fever prevailed to a great extent throughout the State of Illinois and many of the northwestern States. Dr. Allen believes the disease to be due to a specific *materies morbi* generated in the system by the influence of certain external morbid causes. According to his experience it is more liable to prevail during winters of variable temperature, in which a few days of intense cold are suddenly followed by days of thaw, mud, and rain. It is, nevertheless, confined to no particular season. It attacks alike the robust and debilitated, both sexes, and at every age, and those of every social position. While the disease is unquestionably more frequently met with in seasons and localities where there is a decided variableness in the thermometric and hygrometric conditions of the atmosphere, no locality, highlands or lowlands, damp or dry, is exempted from its visitation.

Its mode of attack is various. Commonly there is distinct rigor, general coldness of surface, absence of pulse at the extremities, and coma; or pain may be the prominent symptom, most frequently in the occiput or nucha, but often in other parts of the head, or in the shoulders, trunk, hips, or extremities. The pain quickly increases in intensity—the patient becomes delirious, and then comatose. The delirium which supervenes upon the pain or upon a state of coma is violent, and attended with constant jactitation, sometimes with vociferation and incoherent cries. The leading characteristic of the disease is suddenness of attack with a rapid onset of grave symptoms.

Sometimes at the onset, but usually not until after the lapse of some hours, a discoloration or eruption appears upon the surface, varying in form, sometimes consisting simply of small petechiæ, at others of dark patches, like ecchymoses, or the subcutaneous extravasation of purpura. There is seldom any elevation of cuticle, though occasionally bullæ appear filled with a thin, dark, sanious fluid. Sometimes the eruption approximates the dark mulberry rash of typhus, and in a few cases it is said to resemble the eruption of measles. The discoloration or eruption is not invariably present.

Among the most prominent symptoms is a tonic contraction of the muscles of the back of the neck, sometimes amounting to opisthotonos. There are often present, also, convulsions, paralysis of the extremities, particularly of the arms, or of one extremity only, and also of the optic and auditory nerves, especially the latter; remarkable soreness of the surface and joints when moved or touched. Intolerance of light and sound is sometimes observed. The muscles of articulation and deglutition are seldom paralyzed. Hemiplegia is not unfrequent. Strabismus, unequal size of pupils, and twitching of facial muscles are incidental symptoms.

The pulse is, at first, small, thready, tremulous, irregular, soft, and speedily lost at the wrist. After reaction or a remission, it increases in fulness and force. Slow in the first stage, during reaction it runs up to 120 or 150.

The skin is usually dry and cool; in one-fourth of the cases, however, it is moist; it varies, however, at different periods of the day. The tongue is enlarged and flabby, pale and moist, having a pale ash or white coating passing to yellow or brown.

There is occasionally nausea with vomiting of the usual contents of the stomach, or, in bad cases, decomposed blood, bile, mucus, etc. The bowels are variable, natural, constipated, or affected with severe diarrhoea, the discharges being grumous and offensive. The urine is generally scant, smoky, albuminous, sedimentous, intermixed with ropy mucus and disorganized blood-corpuscles. It may, however, be abundant and of low specific gravity.

The respiration is laborious and irregular, sighing, and perhaps stertorous, or hissing through the clenched teeth; more frequent than normal while consciousness continues, becoming slower with advancing coma.

The disease may terminate in death in a few hours, or in a remission, followed quickly by intense febrile excitement, hot skin, rapid and tense pulse, throbbing of arteries, flushed face, turgidity of conjunctiva, extreme thirst, etc. There is often great delirium, and violent jactitation, requiring sometimes several attendants to restrain the patient. After a time the delirium may merge again into coma, or it may pass into the low muttering form, with subsultus, supine position of patient, fixed extremities, painful to touch or motion, rigidity of muscles of nucha, with head drawn backwards or occasionally sideways. The bowels are inactive; the urine scanty or retained; the skin hot, but often covered with a profuse, offensive perspiration. Irregular or partial sweats are common. The convulsions, paralysis, pain, or whatever other evidence of central nervous disorder, is greatly increased. If the case is prolonged, the irregular febrile phenomena assume a lingering, low, typhoid character, and may continue thus for forty or even sixty days, before the setting in of a tedious convalescence.

In the course of the disease symptoms may present themselves indicating that certain organs have become involved. Thus, the symptoms of lung disease may become prominent, constituting the disease known as typhoid pneumonia.

The abdominal viscera are in some cases, but less frequently, affected. Hæmatorrhœa, hæmatemesis, and hæmaturia are occasionally present to an alarming extent.

Ulceration of the throat has been occasionally observed with great destruction of tissue. Erysipelas is the most frequent and dangerous complication. It is liable to occur upon the slightest scratch or abrasion of the skin, but may make its appearance without any such exciting cause, attacking the face and neck and extending to the scalp. It more rarely appears on the extremities. It is liable to give rise to extensive foul sloughing ulcers, by which the patient is rapidly exhausted.

Among the sequelæ of spotted fever are enumerated deafness, blindness, paralysis of motion—partial or complete, tuberculosis, albuminuria, marasmus, and phthisis. The constitution in all protracted cases becomes broken down, and years will perhaps elapse before the surviving patient will recover his normal vigour.

In respect to the *post-mortem* appearances in cases of spotted fever these are various. In the bodies of those who die early in the attack few signs of local disease will be found beyond a settling of blood in dependent portions, with a loose, diffuent clot, stasis of blood in the capillaries of the cerebro-spinal meninges, of the surface of the convolutions and of the parietes of the ventricles, presenting upon the latter here and there spots like ecchymoses, though more florid in hue. On sections of the cerebral substance large red spots appear, showing a loaded state of the bloodvessels. The same is true of the meninges of the spinal cord, and of the substance of the medulla oblongata, and of the medulla spinalis at its upper portion. The stasis of semi-dissolved blood may be so considerable as to impart to both the white and gray substances a pinkish hue.

Circumscribed softening, to a greater or less extent, of the cortical substance of the cerebrum, the inferior surface of the cerebellum, and floor of the lateral ventricles. There is, in fact, a diminished density and firmness of the entire brain. Effusion into the ventricles of discoloured serum is present, now and

then, to a large amount. In cases attended with intense reaction, the usual results of inflammation may be present. In the brain, the arachnoid is thickened with loss of transparency. There is effusion into the cranium, especially at the base of the brain, at the optic commissure, on the corpora quadrigemina and medulla oblongata, and around the third pair of nerves where it penetrates the arachnoid. The effused matter may contain pus and lymph-corpuscles, or the exuded lymph, loose, creamy, and friable, is spread as a quasi membrane upon the surface, or along the course of the large bloodvessels. It is liable to be stained by the dissolved hæmatin. In the spinal cord the lesions affect mainly the meninges; the substance of the cord is occasionally softened. The morbid changes are most noticeable about the roots of the cervical nerves. When the lungs become involved in the course of the disease we have either stasis of blood and effusion or the usual results of pneumonic inflammation. Abdominal lesions when they occur are always the result of intercurrent disease and present nothing peculiar. Fatty degeneration of the kidneys is said to have been detected in some cases. In very many cases, especially where death has early occurred, the post-mortem morbid appearances are very slight, while in a few cases they are entirely wanting.

In respect to treatment, that which was most relied upon by Dr. Allen consisted in external stimulation, rubefacients, and artificial heat, especially along the spine and to the extremities.

"A potent stimulant," the doctor remarks, "is the application of ice for a few minutes, and then the alternation of hot epithems; this alternation to be frequently repeated. The intense local pain, so often present in the primary stage may occasionally be controlled by full doses of morphia, but usually the amount required is so excessive as to cause them to prove dangerous of themselves. The hypodermic injection will be found more advantageous, though there is always danger of erysipelas resulting from puncture of the skin. Vesicants, also, which primarily are of excellent service, are liable to bring on sloughing cases."

Internally he used stimulants and restoratives boldly, but with due regard to their ultimate depression. This precaution Dr. A. urges especially in reference to alcoholic stimulants; when these are given, he thinks it better to combine them with capsicum, piperin, monarda, &c. Ethereal preparations, ammonia, etc., answer well, he remarks, in some cases.

In Dr. A.'s experience the tincture of cantharides in large doses has been found the most valuable of internal stimulants. From twenty to forty drops may be given every hour until reaction ensues or strangury supervenes, which latter is always a favourable circumstance.

In cases where erysipelas occurs, or the spots on the skin assume a dark livid hue, or passive hemorrhage ensues, the muriated tincture of iron should be administered simultaneously with the tincture of cantharides. Ten, twenty, or more of the muriated tincture may be given with each dose of the tincture of cantharides, in some convenient fluid for dilution.

When intense pain or convulsions occur, the cautious inhalation of chloroform or ether is suggested.

Dr. A. has not noticed any especial good derived from quinia in the first stage of the disease, notwithstanding he had given it in doses ranging from two grains to thirty every hour. When a deceptive remission occurs he believes some benefit was gained by several full doses every one or two hours. The quinia seemed to lessen the severity of the subsequent reaction, without, however, preventing it. Quinia will probably be found more efficacious in the control of cases modified by malarious influences.

On the occurrence of the remission, or the conclusion of the first period of the attack something appears to be gained by relieving the bowels with a moderately stimulating cathartic, particularly when the cold stage has left behind it decided engorgement of the portal system. The ensuing exacerbation is ameliorated, and the tendency to pass afterwards into a low form of fever is sensibly lessened. Dr. A. employs as a cathartic, calomel with gamboge, rhubarb, and soap.

"If during the stage of excitement which follows the urine becomes tolerably

free and charged with its solid constituents, the patient may be considered safe, but if it is suppressed, the case is one of extreme danger."

In the stage of extreme excitement, saline diuretics, sedatives, and anodynes, in moderate doses, may be demanded, but bleeding, vomiting, and purging are out of the question. Ablutions with cold water, the tepid bath, or showering the head, Dr. A. has found useful. When in doubt he has found it the safest plan to stimulate even during the stage of reaction. At all events he advises that the powers of life be sustained by a careful use of restoratives and abundant liquid nutriment. The occurrence of destructive organic changes will thus be prevented, the liability to collapse lessened, and the tendency of the case to run into a low, tedious fever, with doubtful final result, abated.

We have presented a full analysis of the paper of Dr. A., inasmuch as it presents a very faithful account of spotted fever based upon observations made during one of its most severe and extended epidemic visitations. D. F. C.

ART. XXIV.—*Reports of American Hospitals for the Insane:—*

1. *Of the McLean Asylum, for the year 1864.*
2. *Of the Worcester (Mass.) Hospital, for the fiscal year 1863-64.*
3. *Of the Taunton (Mass.) Hospital, for the fiscal year 1863-64.*
4. *Of the Northampton (Mass.) Hospital, for the fiscal year 1863-64.*
5. *Of the Butler Hospital, for the year 1864.*
6. *Of the Retreat, at Hartford, Conn., for the fiscal year 1864-65.*
7. *Of the New York City Asylum, for the year 1864.*
8. *Of the Tennessee Hospital, for the term from Aug. 1, 1862, to April 1, 1865.*
9. *Of the Western Asylum, Kentucky, for the year 1864.*

1. THE report for the year 1864 of the *McLean Asylum*, exhibits the following general numerical results:—

	Men.	Women.	Total.
Patients at the beginning of the year	90	111	201
Admitted in course of the year	56	45	101
Whole number	146	156	302
Discharged, including deaths	56	51	107
Remaining at the end of the year	90	105	195
Of the discharged there were cured	22	20	42
Died	15	12	27

Notwithstanding the enhanced prices of the times, and the very general diversion of money into the channels of war, constant improvement has been made in the accommodations of this hospital. A magnificent building for highly excited men, doubtless the best in the world, whether we regard its adaptation to its purpose, its elegance of architecture, or its perfection of finish, has been erected, and the grounds devoted to recreation for the men have been enlarged by an additional inclosure of more than six acres. Through the centre of these grounds is a row of elm trees "planted more than seventy years ago, and now in full and beautiful maturity."

In his discussion of the characteristics and the treatment of insanity, Dr. Tyler says: "It does not follow that because a person is insane it is indispensable or even best that he should be placed in a hospital; though for a very large proportion of the commonest acute forms of the disorder, such a course is undoubtedly the best; but, like the treatment of any serious disease, it should only be had by the prescription of discriminating and judicious physicians."

Again, in regard to the reasons which often render hospital treatment more effective than home treatment: "The insane man *knows* that he is right. He is more certain of it than a sane man ever is of the most palpable truth; and no matter how debased a wretch he conceives himself, or of how little worth he declares any opinion of his to be, he is sure that his belief is right, and he

rests upon it infallibly, and is entirely incapable of being influenced by argument or appeal. No proof weighs a straw against his settled convictions. And because those whom he has always loved—his own family, who ought, as he thinks, to sustain and coincide with him—now have changed, and become his opposers, his tormentors, his defamers, his enemies, he is doubly embittered against them. The patient is argued, expostulated, and remonstrated with, over and over again. Every proof and evidence possible is brought forward, and every appeal is made with all the force that affection can give, in the hope of doing good, but with the certain effect of harm, of arraying him in his own defence, of exciting resistance, and grounding him more firmly in his own convictions and antipathies. The wife, the mother, the husband, the son, are not only powerless for any good under such circumstances, but increase and aggravate the evil which they are striving to overcome."

And in relation to treatment: "To gain an insane person's confidence so as to exercise over him the only authority and influence which is of any worth, and to which he will cheerfully yield; and, when gained, to give a steady, firm, and *kind* contradiction, not always, nor often, in words, but always in manner and bearing, to a deluded belief; to suspend its exercise and that of its attendant perverted feelings by directing the attention to interesting and healthy subjects of thought; thus leaving the disease to fade from inanition and the sure effect of time; to break up the habit of dwelling upon the one selfish topic of meditation, and dissipate the intensity of long-nursed emotions, by presenting generous motives for action, and exciting benevolent and expansive feelings upon matters outside of self—this is the proper treatment of insanity."

2. The results of the operations of the *Worcester Lunatic Hospital*, Mass., for the fiscal year ending September 30, 1864, are embodied in the subjoined table:—

	Men.	Women.	Total.
Patients at the beginning of the year	197	202	399
Admitted in course of the year	125	101	226
Whole number	322	303	625
Discharged, including deaths	155	126	281
Remaining at the end of the year	167	177	344
Of the discharged, there were cured	70	60	130
Died	17	16	33

Deaths from phthisis pulmonalis, 8; paralysis, 7; epilepsy, 6; marasmus, 4; old age, 2; exhaustive mania, 2; apoplexy, "autochiria," carcinoma, and cystitis, 1 each.

Dr. Bemis writes as follows of a certain class of patients, some of whom are to be found in every hospital:—

"On the part of a small number of our patients there has been an unusual degree of uneasiness at what they consider the wrong and outrage inflicted upon them by their commitment to the hospital. These persons are eccentric, irritable, suspicious, excitable, and under certain circumstances dangerous to the community. They disturb all domestic and social arrangements. They are unreliable in all things. They lead a changeable and often a wandering life. They desert their families and friends while they speak in the tenderest manner of love and devotion. They complain of abuse under the gentlest restraint, and when suffered to roam they talk of neglect. Their minds are exceedingly active in certain directions; and when diverted by the presence of strangers they appear well; but they have lost the power to confine themselves to one place or one occupation, and are not capable of undertaking the responsibilities of active life. They are always treacherous friends and unworthy confidants. While free they display their true character to friends and intimate acquaintances long before any interference, and when subjected to the discipline and seclusion of a hospital, present to casual observers many of the phenomena of sound health. On account of their general tranquillity, rationality, and intelligence they induce many to believe that they are unjustly detained, and should be restored to society. The restraint of the hospital, however, exercises over their minds a

curative as well as coercive influence, and imparts to them vigour and the power of self-control. It throws around them almost their only safeguards, and while receiving condemnation is all the while exerting the happiest influences.

"To discharge such patients from the custody of the hospital would deprive them of care, expose their follies, and subject the community to inconvenience and danger.

"It would be fortunate for such persons, and for the community, and fortunate indeed for the hospital, if there existed some intermediate asylum—some place between restraint and freedom—which might be made a home for the shelter and protection of this troublesome class of our patients."

The practice mentioned, and the views expressed in the subjoined extract, will commend themselves to the favourable judgment of all who have much knowledge of the insane.

"So far as our limited means would allow, we have spared no effort or expense to impart to the hospital the air and aspect and domestic relations of a large family; and so to control and direct its daily life and operations as to give it some of the appearances of a sane community. To do this as it should be done, it is absolutely necessary to devise means acceptable to every mind, however insane, which shall take the place of the real duties and interests of life among a sane population. It is impossible, of course, in a hospital for the insane, to gratify all tastes and accommodate all fancies, unless a liberal allowance is made for their support. All labour among the insane, except the merest drudgery, must be prepared and directed by men and women skilled in that particular department of labour. All exercise and amusement must be watched over and assisted by sane minds. All instruction must be given by those apt to teach. All the surroundings of a hospital for the insane should be cheerful and hope-inspiring. Everything should speak to the eye, the ear, the taste, the touch, and the nose even, of peace and comfort, hope and assurance."

3. At the *Taunton Lunatic Hospital*, Mass., the statistics for the official year terminating with the end of September, 1864, are as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year	204	198	402
Admitted in course of the year	97	106	203
Whole number	301	304	605
Discharged, including deaths	137	105	242
Remaining at the end of the year	164	199	363
Of the discharged there were cured	52	47	99
Died	18	21	39

Deaths from phthisis, 9; general paralysis, 6; maniacal exhaustion, 4; apoplexy, 4; paralysis, 4; chronic mania, 2; epilepsy, 2; marasmus, dysentery, inanition, gangrene, burn, pneumonia, gastritis, and measles, 1 each.

"The immunity from acute disease which is shown by this table," says Dr. Choate, "is worthy of remark, and affords much room for speculation as to the agency of the mind in the reception of impressions from atmospheric and other causes by the physical system. During the present season typhoid fever has been very prevalent in the neighbourhood, and in the month of September, six out of the forty-five sane persons in the house had the disease; while out of the three hundred and seventy insane, but one, and he a convalescent, was attacked. Chronic organic disease, especially phthisis, gradual exhaustion from long-continued excitement, and the sudden failures of the vital powers which are the frequent results of degeneration of the brain, are the causes of three-fourths of our deaths."

In relation to the causes of insanity, the doctor uses the following language:—

"The physical causes, while the more frequent, are fortunately also the more easily guarded against, and produce, on the whole, a larger proportion of curable cases. At the head of them stands that great cause of mental as well as physical disease, indulgence in the intoxicating cup. More than one-fifth of the cases this year are confessedly and directly from the operation of this curse. How many more are due to its indirect influence, through poverty, disturbance of

family happiness, pecuniary losses, broken health, and especially through its poisonous effects upon a succeeding generation, who can tell? That it is directly and indirectly the cause of much the larger part of the cases attributed to the various physical influences, cannot be doubted.

"The moral causes are less under the control of the individual, and consequently less can be done for their prevention; still we may learn from this table (of causes) that it is the part of prudence to avoid excessive fervour of zeal and intense preoccupation of mind, even with holy things; to shun the development in the mind, and its concentration upon one train of thought or feeling; and to beware of fixing the affections so strongly upon worldly possessions that the loss of these will bring another loss, more severe and terrible still. The great warning to be derived from an examination of the causes of insanity may be briefly stated to be against forming habits of excess.

"Excessive labour, excessive study, excessive indulgences, excessive zeal for either temporary or religious matters, if they become fixed habits of life, are likely to produce mental disease. Both the mental and the physical system are so constituted that they easily and quickly rally from the disturbing influence of a single violation of nature's law; but a continued habit of excess in any direction will, in the end, destroy the elasticity of one or both, and disease must be the result."

4. On the first of April, 1864, Dr. Prince, Superintendent of the *Northampton Lunatic Hospital*, Mass., from the time of its opening, resigned his office, and Dr. C. K. Bartlett, for several years his assistant physician, was appointed Superintendent *pro tempore*. On the second of July next following, Dr. Pliny Earle was elected for the place and entered immediately upon the performance of its duties.

The fiscal year of the hospital terminates with the close of September. The term of service of the physician last named constituted but a minor fraction of the year, and hence the statistics of the report are mostly the statistics of his predecessors.

	Men.	Women.	Total.
Patients in hospital Sept. 30, 1863	167	216	383
Admitted in course of the year	48	45	93
Whole number	215	261	476
Discharged, including deaths	71	71	142
Remaining Sept. 30, 1864	144	190	334
Of the discharged there were cured	30	18	48
Died	17	30	47

Died with phthisis, 19; marasmus, 12; paralysis, 4; exhaustion, 3; epilepsy, 3; chronic diarrhœa, 2; pneumonia, strangulated hernia, disease of stomach, and typhomania, 1 each.

"It will be perceived that nearly all the mortality has arisen from chronic disorders. * * * There has been but very little acute disease at any time in the course of the year. Although dysentery prevailed to a somewhat alarming extent in the vicinity during the unusually warm weather of the summer, yet there were but two or three cases in the hospital, and these were so slight and so amenable to treatment that they were readily restored by the ordinary remedies."

5. The report of the *Butler Hospital for the Insane* opens with a numerical statement of the results of operations during the year 1864.

	Men.	Women.	Total.
Patients at the beginning of the year	68	62	130
Admitted in course of the year	26	23	49
Whole number	94	85	179
Discharged, including deaths	27	20	47
Remaining at the end of the year	67	65	132
Of the discharged there were cured . . . . .	.	.	15
Died . . . . .	.	.	12

"One of those who died was eighty-four years old; another, eighty; and another, seventy-four."

A building 85 feet by 36, and two stories in height, intended to inclose a bowling-alley and give room for other amusements, was erected near the hospital in the course of the year. Its cost was defrayed by two gentlemen, "friends of the institution."

In this report Dr. Ray continues a discussion, begun in his report for 1863, upon the principles and phenomena of hereditary transmission. He takes the ground that this transmission implies not merely the repetition of the disease "without any obvious change, but also the conversion of one degree or form of it, in the course of its transmission, into another degree or form, the essential element thus transmitted being only cerebral infirmity or defect."

"Gout, apoplexy, or consumption," says he, "never passes, fully formed, from parent to child, but only such a constitution of the inmost principles of the vital organism as, under favouring circumstances, may, in the course of time, be converted into one of these diseases. * * * Insanity is subject to the same law of transmission as other diseases."

To illustrate the fact that one generation may be overleaped in hereditary transmission, as well as the theory asserted to be true that *one form* of mental disorder may give to posterity *other forms*, the following language is used:—

"The eccentric old man whose conduct and discourse make him a by-word among people, perpetuates his name in half a score of children who manifest no mental obliquity or defect, while among their offspring may be found a countless variety of each, from the simplest peculiarity to furious mania. It may appear in early youth in the form of chorea, epilepsy, catalepsy, proclivity to mischief, or fits of passion; in maturer years, in the form of alternate excitement and depression, of irresistible propensity to drink, of striking peculiarities of behaviour, of some strange, unexpected, and inexplicable act, of raving mania; in advanced age, in the form of premature decay, or complete dementia. The incident from which all the subsequent evils have originated may have been a slight eccentricity, hardly perceptible to the world, chronic neuralgia of the head, habitual intemperance, excessive study, or protracted vigils, a defective development of the brain while young, produced by bad physical influences, such as impure water and air, lack of ventilation, crowded and uncleanly dwellings, hardship, and hunger. Looking either to the cause or the effect, we see the utmost possible variety, and the fact should teach us to be cautious how we undertake to circumscribe the range of nature's operations in the broad domain of cerebral disease. But the ailment, whatever it may be—whether it come in some familiar form of mental disorder, or one of those obscure conditions which perplex both the wise and the simple—whether it break out suddenly, or go through a long course of development—is the last of a series of morbid or abnormal movements whose beginning was in a previous generation. The more extensive and accurate our observations, the more strongly is this fact confirmed; and it must be thoroughly understood and appreciated if we would avoid a very common error on the subject."

The argument proceeds with the assertion, deduced from what has preceded, that, in all cases, it is as essentially important to investigate, and to make all due allowance for, the minor forms of transmitted cerebral disease, as it is the major or severer forms.

Coming at length to the practical application of his doctrines, the doctor says:—

"When a criminal act is committed by one who has previously given no indications of mental disturbance, though the circumstances of the act may raise suspicion of unsoundness, and we find any of those traits which are indicative of hereditary tendency to the disease, we are bound to allow this fact some weight at least in our estimates of responsibility. We are bound to allow ample scope and verge for the unmistakable manifestations of disease, before we lay upon the offender the usual consequences of crime. How far it should be allowed to affect legal responsibility can only be ascertained by a thorough and intelligent investigation of the circumstances of each particular case. The results to which we arrive must always be more or less conjectural, but they may, at the least,

furnish ground for doubt where confidence might lead to injustice. They might stay the hand of the law until doubt should be converted into certainty, and the cause of truth and right be amply vindicated before men.

"Let me not be misunderstood. It is no doctrine of mine that a man is irresponsible for any and every crime he may commit, or for any moral delinquency, simply because some of his progenitors were insane. What I contend for is, that when such a fact appears in evidence, it should be investigated in all its relations to the party concerned, under the light derived from the present state of our knowledge on this subject in order that it may be ascertained if the mental infirmity, by being transmitted, in some form or other, has determined at all his volitions, impulses, or acts. If, under such an investigation, it shall appear that his character or conduct has been marked by peculiarities like those which usually spring from the hereditary taint, and especially if it appear that the criminal act was accompanied by none of the ordinary circumstances of crime, then a reasonable doubt is thereby raised of his legal guilt, and a suspension of judgment justified until farther developments shall have shown the true nature of the case. If, on the other hand, the act in question appear to have been a rational act, rationally done, that is, prompted by the usual incentives to action, and the individual has been free from any mental obliquities that might be fairly attributed to the hereditary taint, then it cannot be justly put forth as a ground of exemption from the ordinary consequences of crime."

6. The numerical history of the patients at the *Retreat for the Insane*, at Hartford, Conn., during the fiscal year closing with the end of March, 1865, is thus expressed:—

	Men.	Women.	Total.
Patients at the beginning of the year	117	114	231
Admitted in course of the year	74	81	155
Whole number	191	195	386
Discharged, including deaths	72	76	148
Remaining at the end of the year	119	119	238
Of the discharged there were cured	27	30	57
Died	13	14	27

Died from "simple exhaustion," 9; exhaustion from acute mania, 3; apoplexy, 3; epilepsy, 3; disease of brain, 2; general paralysis, 2; disease of liver, pyæmia, pneumonia, diarrhœa, and general debility, 1 each.

Dr. Butler thus writes of our national history during the last four years, in its relation to mental disorder:—

"The effects of the war have been very different from what we all expected—it has not, upon the whole, as a specific cause, increased our numbers. The insanity of a small number of our female patients can be traced directly to its results. They have come from the families of soldiers, broken down by the impoverished circumstances in which they were left, and the natural anxiety and distress attending their condition. We have one young boy, the son of a soldier, who has been made furiously insane by a knowledge of the terrible sufferings and consequent death of his father in the rebel prison at Andersonville. On the other hand, quite a number of cases of old patients who had relapsed, and others in whom the premonitory symptoms of insanity were developed, and about whom I had been consulted, and had consented to receive as patients, have made a wiser choice and gone into the army. They have been relieved from the exciting causes of insanity which surrounded them at home, and have found in this change of their whole manner of life—its new and varied scenes and occupations, and above all its system and discipline, precisely those influences which, as remedial agencies, their cases demanded. Again, higher and nobler influences have been called out to antagonize and overcome those natural tendencies to mental disturbance and insanity which ever attend all great social convulsions."

He mentions a table in a former report, whereby it is shown that of 9473 cases of insanity "four-fifths of the whole were the results of ten causes, all of which

are such as exhaust, debilitate, or depress the vital or nervous energy," and continues:—

"Now it must be evident that a sensual and selfish, or idle and aimless life, must inevitably act as a predisposing cause to the development of one or more of these causes. It is also true that a large proportion of the more than three thousand cases of insanity which have come under my care, might have been prevented by the use of well-known measures of natural and right development of body and mind, wise aims in life and a reasonable exercise of self-control. The power of the will to control the insane impulse is great; but the will must be trained and be conscious of its power to effect this result. The question, therefore, how shall I escape insanity? is one capable of a more direct and explicit answer than many parents and educators of youth seem to imagine. It follows, therefore, as a necessary consequence, that whatever makes us better or wiser, gives us more correct views of our duty to God and our neighbour, and at the same time gives us more strength, courage, and willingness to do that duty, places us so much more beyond the reach of these causes of insanity, and gives us also the greater ability to resist successfully the attacks of this disease, when induced by causes beyond our control."

7. The report for 1864 of the *New York City Lunatic Asylum*, bears to us the unwelcome intelligence of the decease, by typhus fever, on the 17th of December, of the said year, of Dr. Moses H. Ranney, who, for eighteen years, had been the Resident Physician of that institution, an office which he not only long but successfully and honorably filled. Devotion to his employment, equability of temper, joyousness rarely sullied, sociability of nature, and great love of the study of mental philosophy, were among his prominent characteristics. As a metaphysician he has left no superior in the ranks of psychopathists of the United States.

The report before us is signed by James C. Culbertson, Acting Resident Physician.

	Men.	Women.	Total.
Patients in hospital January 1, 1864	262	509	771
Admitted in course of the year	149	217	366
Whole number	411	726	1137
Discharged, including deaths	150	228	378
Remaining, December 31, 1864	261	498	759
Of the discharged there were cured	—	—	160
Died	59	52	111

Died with phthisis pulmonalis, 32; *paralysie générale*, 18; epilepsy, 10; congestion of brain, 8; typhus fever, 7; debility, 7; apoplexy, 4; paralysis, 4; typhomania, 4; typhoid pneumonia, 2; dysentery, 2; diarrhœa, 2; chronic diarrhœa, 2; ascites, 2; erysipelas, 2; softening of brain, 2; organic disease of heart, 1; aneurism of arch of aorta, 1; hypochondriasis, 1.

Acknowledgment is made of the receipt of "many presents of books, newspapers, greenhouse plants, shrubbery," &c. It is due to the memory of Dr. Ranney to say that it was by his efforts that the attention of the charitable of the city of New York was first drawn, to any considerable extent, towards the inmates of this hospital. Before his time, Borrioboola Gha was much nearer to the hearts of that class of citizens than was Blackwell's Island.

8. The next report upon our list is that of the *Tennessee Hospital for the Insane*, the first which we have received from that institution since the beginning of the civil war. It covers the period from August 1, 1862, to April 1, 1865.

This hospital is a few miles from Nashville, on "the great military thoroughfare" from that city to Chattanooga; and hence, during the active operations of the contending armies in that vicinity, it was necessarily exposed to the hazards and the dangers incident to military strife.

Before the war the hospital was under the superintendence of Dr. W. A. Cheatham. What became of him we are not informed; but it is stated that the present occupant of the office, Dr. William P. Jones, was appointed to the place

by Gov. Andrew Johnson, and entered upon the performance of its duties on the 25th of July, 1862.

"Very soon after I was commissioned," writes Dr. Jones, "two divisions of the Federal army encamped upon the farm, and, despite of orders, within a few days burnt our supply of wood and about five miles of excellent cedar fence, thus leaving us, late in the fall, without fuel, and the farm almost fenceless.

"The indefatigable foreman, George Richards, nothing daunted, set to work and rebuilt about two-thirds of the fence in time for ploughing and planting in the spring, and succeeded in raising a bountiful crop the next and succeeding seasons.

"In regard to fuel we were frequently in want, and on the verge of suffering, but fortunately never suffered. Occasionally you might have seen, before daylight, the Superintendent, the farm hands, and a few patients, in the woods felling trees and hauling fuel to warm the house, that others might be comfortable. The work had to be done, and we did it early and cheerfully.

"Sometimes, owing to military orders, obstreperous provost-marshals, or other causes, we retired at night not knowing where subsistence for the next day should come from; but each succeeding day brought with it, in the Providence of God, bread enough and to spare."

	Men.	Women.	Total.
Patients in hospital, August 1, 1862	115	89	204
Admitted up to April 1, 1865	104	30	134
Whole number	219	119	338
Discharged, including deaths	125	43	168
Remaining, April 1, 1865	94	76	170
Of the discharged there were cured	57	20	77
Died	27	10	37

Deaths from dysentery, 3; chronic diarrhœa, 3; phthisis, 3; marasmus, 7; epilepsy, 4; apoplexy, 2; pneumonia, 2; maniacal exhaustion, 2; cystitis, enteritis, tabes mesenterica, metastasis to brain, meningitis, softening of brain, paralysis, congestion, scrofula, carbuncle, and "unknown," 1 each.

In the table of "probable causes" of the insanity of the 134 patients admitted, no less than *sixty*—58 males and two females—are assigned to "excitement incident to war;" but, further on, Dr. Jones says: "Though I have presented sixty cases of derangement, apparently superinduced by causes incident to the war, such as exposure to camp-life, destitution of political refugees, nostalgia, etc. etc., yet I very much question whether, in the majority of cases, these have not taken the place of other exciting causes; and whether, indeed, the proportion of cases is greater than would have been developed, in an equal number of persons engaged in the ordinary pursuits of life. In other words, and notwithstanding the destitution and devastation of armies, the aggregate population of citizens and soldiers has probably not furnished during the war a larger number of insane than would have occurred independent of the war and in times of peace."

9. The new building of the *Western Lunatic Asylum* of Kentucky is still incomplete, but considerable progress was made in its construction during the year 1864.

	Men.	Women.	Total.
Patients at the beginning of the year	60	54	114
Admitted in course of the year	21	14	35
Whole number	81	68	149
Discharged, including deaths	15	11	26
Remaining at the end of the year	66	57	123
Of the discharged, there were cured	9	5	14
Died	6	5	11

A very large proportion of the cases in this hospital are chronic and incurable.

"I have often been asked the question," says Dr. Rodman, "if the war and its incident troubles have added to the frequency of insanity. I was one of those

who feared, particularly in the more disturbed sections of the country, that they would add largely to the insane. The district allotted to the Western Asylum comprises much the larger portion of the State, and that part which has suffered most from the unavoidable ravages of contending armies, and from a system of guerrilla warfare, for the last three years, that has desolated some of the counties of our district, and driven thousands from their homes in poverty and distress—circumstances that seem most calculated to give impetus to the causes of mental derangement; yet from these causes, to the present, since my connection with the asylum, there has been received but one patient whose disease could be attributed to this source.”

The report of Dr. Rodman is brief, and its contents mostly of a character not specially interesting to the general professional reader. P. E.

ART. XXV.—*Transactions of the Obstetrical Society of London.* Vol. VI.
For the year 1864. 8vo. pp. 322. London, 1865.

At the annual session, held January 6, 1864, the President, Dr. OLDHAM, delivered an address which is mainly occupied with an exposition of the present condition of the Society, and the success which has attended its efforts to extend a knowledge of obstetrics among the members of the profession, and to perfect it in a scientific and practical point of view by eliciting and placing upon record the individual experience of its Fellows. In the course of the address, he alludes to the difference of practice which prevails among English obstetricians as to the length of attendance upon the puerperal female in ordinary cases. While some consider it their duty to visit the patient for one month after delivery, however well or ill she may be, Dr. Oldham considers that one week is sufficient for ordinary convalescence; any complication arising after that time requiring his care, he regards as a new engagement. In connection with this question Dr. Oldham makes some very important suggestions in respect to the proper management of the puerperal state to which we would call the earnest attention of American obstetricians.

“I know no sufficient reason why our limit of attendance should not be a puerperal week rather than a puerperal month. In all cases where parturition and lactation have been normally completed, I can only understand the need of a medical care for a month on the supposition that the precepts which are laid down in some of our midwifery books for the management of this state, steadily induce a debility in the first fortnight which requires a drawling convalescence in the next fortnight to be overcome. Parturition and its immediate results ought to be divorced from disease, and not be made to wear its likeness. But if directly a woman is safely delivered, without one untoward event or indication, she is made to take opium to arrest possible pains, and is then put upon a rigid diet of slops, lasting from three to five or seven days, to arrest the phantom of inflammation; if her natural impulse to liveliness is carefully toned down, to avert what is called excitement; and if for a fortnight she is kept in the recumbent position, to avert a supposed tendency to prolapsus, I say that, from first to last, elements of weakness and nervous disorder are introduced, and the very diseases are invited which they were designed to avert. I know of no reason why, if a woman is confined early in the morning, she should not have her breakfast of tea and toast at nine, her luncheon of some digestible meat at one, her cup of tea at five, her dinner with chicken at seven, and her tea again at nine, or the equivalent, according to the variation of her habits of living. Of course, there is the common sense selection of the articles of food, guarding against excess, and avoiding stimulants. But gruel and slops, and all intermediate feeding, are to be avoided; and I affirm, having followed this plan for nearly twenty years, and inculcated it as a teacher, that the process of involution is greatly assisted by it; it averts the tendency to disorder of the nervous system; it promotes an easy lactation; after-pains are lessened by the freer ex-

pulsion of clots; the tone of the muscular and elastic fibres of the supporting tissues of the uterus is sooner restored; the danger of inflammation, which, as we know, is phlebitic, is far less. A patient may be removed from the bed to a sofa in two or three days. Her life may be one of cheerfulness, and the process of convalescence be abridged to the puerperal week."

In our notice of the papers which are comprised in the present volume of obstetrical transactions we shall pass by some three or four, a brief analysis of which has already appeared in the quarterly summaries of this journal for the past eighteen months.

A case of *lesion*, supposed to be *rupture of the placenta*, is related by Dr. H. M. MADGE. A female, æt. 20, advanced four and a half months in her first pregnancy, while carrying a pitcher of water up stairs, fell forwards, the busk of her stays being driven with great force against the lower part of her abdomen. Great pain was experienced at the part struck. The patient was confined to her bed for two or three days. More or less pain continued for a fortnight, when she miscarried. The only points of interest connected with the miscarriage, are, 1st. The very small amount of hemorrhage by which it was attended. 2d. A slight constriction of the cord near its placental insertion; and 3d. A torn or ruptured appearance of the placenta. The latter, also, contained within its substance a large clot of blood, which seemed to have disorganized and displaced nearly one-half of the normal structure. Now the question is, how was the clot of blood formed? Dr. Madge believes that it was the result of a rupture of the placenta at the time of her fall; such an occurrence, he thinks, from external violence, we have every reason to believe possible.

Mr. E. E. DAY relates a case of *extra-uterine foetation followed by intra-uterine pregnancy*. A female, who had had five children, pregnant for the sixth time, came under the care of a student of King's College Hospital, September 6th, 1859. A tumour was discovered in the recto-vaginal pouch; it was pushed up, and the head of the foetus descended into the pelvis. January 7th, 1861, she was admitted into the hospital, and premature labour, at eight months, induced. After repeated examination, the propriety of removing the tumour was discussed. It was decided to leave it alone, inasmuch as the peritoneal cavity would have to be opened in the operation.

In August, 1862, she again came into the hospital with flooding, and was delivered of a seven months' foetus. The tumour seemed somewhat larger from thickening of the neighbouring tissues. She left the hospital October 1. She became again pregnant, and was received into the hospital in the beginning of May, 1863. The tumour was now about the size of a goose's egg; it was situated at the back of the vagina, in the recto-vaginal pouch, passing backwards by the side of the rectum, apparently towards the sacrum, to which, however, it was not adherent. It had a hard, nodulated character, giving the idea of a mass of hardened feces. Labour was induced at seven months and a half. At 3 o'clock P. M., May 18, 1863, Dr. Day began by separating the membranes all around the os uteri. Labour not coming on by 8 P. M., a pyriform caoutchouc bag was gradually introduced, base foremost, into the uterus, and gradually inflated. The air was then allowed to escape; it was again inflated and emptied; and so on for twenty minutes. The bag then burst. 19th, 3 P. M., pains had been coming on gradually, but with little result. Two doses of ergot were given. 20th. Pains increased in frequency. The os dilated to the size of a crown-piece; membranes protruding at each contraction; head presenting; pulse 120. The membranes were then punctured; in a few minutes a contraction took place which drove down the cord. As this could not be replaced, the child, with great difficulty, was turned, and delivered dead. The placenta was adherent and friable. The uterus contracted well, but in about six hours and a half subsequently it became relaxed and rose to the umbilicus. Cold applications and pressure caused the extrusion of several clots, and it resumed its proper size. Next day, lochia natural; severe after-pains. In the evening an opiate draught. 22d. Pains less; uterus well contracted; pulse 110; a somewhat irritating cough. In the afternoon her husband and mother came to see her. She sat up and talked to them, and then took tea. Soon after hemorrhage came on, under which she rapidly sank and died.

On a post-mortem examination, there was found in the recto-vaginal pouch a fœtus of perhaps three or four months inclosed in a thin cyst, and attached to the peritoneum on the right side of the rectum. The right Fallopian tube contained in its outer half what, when cut into, seemed to be an organized clot and remains of deciduous membrane. The Fallopian tube of the right side was attached to the base of the uterus, while that on the left side was attached to the fundus. This peculiar position seemed to show a disposition to a bifid uterus.

The points worthy of note in the above case are, 1st, the escape of the ovum from the Fallopian tube without causing death, while no history could be obtained of the accident. 2d. The peculiar position of the Fallopian tubes; and 3d. The method of inducing labour, by alternately dilating and relaxing the cervix. It is believed that this procedure, if it be continued for three-quarters of an hour or an hour, will induce labour as nearly as possible under natural circumstances.

Mr. SAMUEL NEWHAM gives a description of a "*guide hook*." It is simply the common obstetrical blunt hook, with the addition of a prow or guide. This addition is for the purpose of favouring the adjustment of the hook in many positions in which the latter is required. It is not proposed by this instrument to supersede the use of the ordinary blunt hook, as circumstances may occur in which it might not be proper to use the guide hook. It is intended to supplement many purposes which the blunt hook is not intended to carry out: such as the insertion of the hook into any opening, whether a natural one or one effected by the previous use of any other instrument—in many cases of craniotomy, for example. In cases of asymmetrical pelvis: the guide hook is also of great service in turning the direction of the head into a more convenient axis—the guide for this purpose being thrust into the base of the skull and rotated. The guide hook is also of value in perforating or thrusting into the thorax, whether before or after the removal of the arm; and, finally, in cases of evisceration through artificial openings, or through the anus, the guide hook much facilitates every proceeding.

A preparation was exhibited by Dr. DAY in which adhesions existed; the uterus being tied back to the rectum by bands of lymph, which also tied the left ovary down to the back of the uterus; the fundus uteri being dragged down by the adhesions with the rectum.

Mr. THOMAS BRYANT, Assistant Surgeon to Guy's Hospital, relates ten cases of ovariectomy. Of these six terminated favourably, namely, two of unilocular ovarian tumour of two and a half and four years' duration; and four of multilocular ovarian tumour, three of one year's duration and one of one year and a half duration. Four of the cases terminated fatally, namely, two of multilocular tumour of two and three years' duration; one of ovarian dropsy of both ovaries, of two years' duration, one of semisolid ovarian tumour of some years' duration.

In three of the cases which proved fatal, it is stated that the patients' general condition was such as forbade the entertainment of any great hope of a successful termination.

The remarks appended to this paper in reference to the condition of the patient before the operation, to the operation itself, and to the after-treatment, are highly interesting; they will be read with interest by all who feel it their duty to perform ovariectomy in suitable cases.

A case of fatal "*umbilical hemorrhage*" in a female, infant, is related by Dr. GRAILY HEWITT.

The mother of the infant, which was born about the eighth month, was weak and ill nourished. She had previously lost a child, a few days old, from bleeding at the mouth, ears, and rectum. At birth the child was weakly with languid circulation. In the course of a few hours it became jaundiced. Second day after birth a slight appearance of blood was noticed at the insertion of the cord; the hemorrhage soon after set in; the blood exuded as from a sponge at the junction between the cord and the abdominal wall. The child one hour subsequently had become excessively pale and moribund. Further loss of blood was now prevented by the application of a ligature *en masse*, but in an hour afterwards the child died. Post-mortem examination showed great congestion of the

liver, and slight effusion of blood into the peritoneal sac. There was no ulceration of the stump of the cord inwardly through the abdominal wall.

In a large proportion of Grandidier's cases of umbilical hemorrhage in infants, jaundice was present; in a few the existence of a hemorrhagic diathesis was well marked. The most successful mode of arresting the hemorrhage experience has shown to be by the ligature *en masse*.

The mortality from this affection is said to have been 83½ per cent., but this computation has been made from a collection of cases well or badly treated or not treated at all. With the prompt use of the ligature *en masse*, by skilful hands, we are very certain that the mortality will fall considerably below fifty per cent.

Dr. W. TYLER SMITH reports eight additional cases of "*ovariotomy*," five of which terminated favourably, namely, one of multilocular tumour, one of rapid growth, and others which had been growing respectively for about eighteen months, two, three, and ten years. Of the twenty cases of ovariotomy, including twelve detailed at a former meeting of the society, which Dr. Smith has now reported to the society, sixteen, or 80 per cent., have recovered. If it be considered that one of the cases, in which the patient died of bronchitis three weeks after the operation, should also be included among the fatal cases, the cures would still amount to 75 per cent. Dr. S. has returned the pedicle into the pelvis in ten cases, and is strongly disposed to recommend the practice to others. In all the cases operated on by him, the disease had either advanced so far as to disable the patients from performing their ordinary duties, or their condition was such that the operation could not have been delayed longer without risk to life. The patients were all operated on in private lodgings.

Dr. RITCHIE gave an account of the operation of "*cephalotripsy*," as performed at Vienna by Professor Braun. The instruments employed are a perforator or long curved trephine and the cephalotribe. These instruments are the invention of Dr. Braun, but he lays no claim to any great originality. Kiwisch and many others are in the habit of using a trephine-shaped perforator. Braun merely gave the instrument a pelvic curve.

Dr. RITCHIE pronounces the cephalotribe of Braun to be, without doubt, the lightest, neatest, and most practicable instrument of the kind which has yet been made public, and the compressing apparatus the best which has yet been devised. Dr. Barnes considered the instruments as objectionable from requiring two persons to work them, the perforator also he held to be too complicated, and as requiring in its use a needless waste of time. Dr. Barnes recommended, from several years' experience in its use, a perforator recommended to him by Dr. Oldham as in all respects preferable to that of Braun.

Dr. HEWITT exhibited the cephalotribe used by Pajot, of Paris, which, he remarked, for simplicity and efficiency was, in his opinion, equal if not superior to any other. The crushing force which it exerted, and which was applied by means more simple than in the cephalotribe of Professor Braun, was something extraordinary.

Cases are rare in which such an instrument is required, but in certain instances of very narrow pelvis, delivery can be effected more safely and easily with the aid of a well-constructed cephalotribe than without. Drawings are given of the instruments of both Braun and Pajot, to which we refer our obstetrical readers.

A case of "*Cauliflower Excrescence of the Uterus*" is related by Mr. E. F. FUSSELL.

A sallow-looking but not emaciated woman; married; æt. 49; has two children living, youngest nine years old; had suffered from pains in the loins and hypogastric region for two years, attended with a constant watery, often bloody discharge. On examination a tumour was found, low in the vagina, about the size of a turkey's egg, and completely surrounding the os and cervix, so that no opening could be detected. The mass bled, but did not easily break up on pressure; it was free in the vagina, and the uterus was quite movable. No enlargement of inguinal glands. The tumour was removed by the wire rope *écraseur*. The patient was much exhausted; swelling and redness of the right lower extremity supervened, and she gradually sank in five days.

After death no evidence of peritonitis was discovered. Iliac and femoral

veins obstructed by coagula. Connected with upper portion of uterus were a number of fibrous tumours, while from its neck to its middle, on the posterior surface, extended a soft flocculent mass, which, examined by Dr. Ormerod, was found to consist of little else than shreddy fibres. Some of the membranes into which the fibres run here and there took distinctly the form of vessels, and a few of them had dilated ends. The surface where it had been preserved from injury presented minute cauliflower excrescences, small, ill-defined, more like tubercular points than regular club-headed growths. The microscopical examination of the tumour showed that it was essentially made up of loops of blood-vessels, with but little fibrous tissue; there were a number of large compound and a few caudate cells.

As well remarked by the relator, this case illustrates a fact which must largely influence our prognosis in these tumours. The body of the uterus was involved: had it been free from disease the operation might have alleviated suffering for some length of time; though, considering the almost absolute certainty of return of the tumour after removal, and its destructive influence, these growths are justly placed by some in the same category with cancer.

Dr. A. HARRIS relates a very rare case: one of "*hydro-encephalocele*" in an infant. At birth a tumour was found hanging from the back of the head, formed by a prolongation of the scalp, and containing fluid; its cavity communicated, by a rounded opening through the upper part of the occipital bone, with the interior of the cranium. The tumour in circumference measured nine inches, and in length four and a half. The infant was full grown and apparently healthy. On the day after birth the tumour was punctured, at its lower part, with a small trocar and canula, and about four and a half ounces of transparent fluid removed, which was found to be highly albuminous. The brain was now felt protruding through the opening in the occipital bone. At the end of twelve days the sac was again full; a second puncture by the trocar and canula gave discharge to about the same quantity of fluid as at first, but much less albuminous. Appearance of child but little changed; partakes heartily of milk. Within nine days the sac again filled, and emptied itself at the place of one of the former openings. The child began to waste. The fluid continued to escape at intervals through the puncture. The child lived, but gradually sinking all the time, for some fifteen weeks. A bandage had been applied, but the parents, thinking it injurious, would not consent to its continuance. Tonics were at first administered.

The mother was not aware of having had any fright or accident; had always enjoyed good health.

No examination after death was permitted.

Mr. T. W. NUNN relates a case of *inflammation* and *abscess* with *extensive destruction* of the *right hip-joint*, occurring in a female twenty-one years old. The inflammation commenced about nine days after delivery. The patient died thirty-seven days subsequently. The case is noticed chiefly from the insidious manner in which the disease of the hip developed itself, independent apparently of uterine phlebitis, purulent infection, or of puerperal fever as ordinarily manifested. The treatment consisted in the administration of quinine, bottled stout, wine and brandy in large doses, cod-liver oil, and iron, with poultices to inflamed joint. The abscess was opened with the knife on the twenty-eighth day of the disease.

On examination after death, the hip of the right side was found completely disorganized. The cotyloid cavity and neighbouring osseous structures were bared of cartilage and periosteum respectively, as was also the head of the femur. Matter had penetrated into the pelvis through the obturator foramen, where it lay under the fascia, and had infiltrated into all the adjacent intermuscular spaces. Uterus and other pelvic viscera healthy and perfectly unimplicated as regards the purulent infiltration. Iliac and pelvic veins normal. Liver weighed 3 lbs. 12 oz., pale, smooth; its cells loaded with oil. Spleen 9½ oz., large, friable. Lungs very pale, anæmic; old adhesions. A cretified deposit, size of a pea, in the apex of left lung, and a solidified patch about the size of a bean, with a yellowish, softened centre, like a pyæmic deposit, in the lower lobe of the right lung, close to its posterior surface.

Another case is related of an abscess of the left hip-joint, which occurred about two months after confinement. Pain of the joint was complained of by

the patient some three or four days after the birth of her child. The patient recovered eventually, so as to be able to work as a servant. This case was communicated by Mr. Fenwick.

An instance of violent inflammation of the hip-joint, commencing on the first or second day after confinement, is related by Dr. Martyn. No suppuration occurred. The management of this case was by bringing the affected limb down parallel to the sound limb, and keeping it fixed upon a double inclined bed for at least seven months. At the end of about twelve months the patient could get about with the aid of crutches, and gradually recovered her power of walking; the limb regaining tolerably free mobility at the hip-joint, but showing a shortening of three or four inches. The patient often felt a grating sound at the hip-joint, and for three years subsequent to her leaving her couch any jerk or shock to the limb caused great pain at that part.

Mr. Nunn queries, how soon may an incision, in case of suppuration, into the joint be made? Would not, he suggests, the intense pain, swelling, and high pulse, with symptoms of exhaustion, warrant us in making, without waiting for fluctuation and other positive signs of suppuration, a deep incision even into such a joint as that of the hip? Dr. Martyn was opposed to any interference of the kind. We have abundant evidence showing that large collections of pus in these cases may be absorbed. The main thing to be done, as he believes, is to fix the limb in a straight or semi-flexed position, and leave the rest to nature.

Dr. HALL DAVIS exhibited and described a new "*craniotomy forceps*," for an account and drawing of which we refer to the volume under consideration.

Dr. MEADOWS exhibited a form of bandage to take the place of the jack-towel usually applied around the abdomen after parturition. It was made of stout calico shaped to the abdomen and hips, with a single bone in front for extra support. When adjusted, it can be fastened firmly either by buckles or laced like a corset. The advantages claimed for it are facility of application, comfort to the patient, and greater efficiency.

"*Immediate transfusion*" is the subject of a paper by Dr. J. H. AVELING. The simple apparatus proposed by Dr. A. is, he believes, calculated to render the operation of immediate transfusion of blood, in the cases to which transfusion is adapted, safe, easy, uninterrupted, and a close imitation of nature. The apparatus is declared to be effective, simple, portable, and inexpensive. It consists of two small silver tubes to enter the vessels, and of a gum-elastic pipe by which they are united. This pipe expands at its centre, so as to form a cavity sufficiently large to hold about two drachms. By this means the vessels of the subject from whom the blood is obtained are made continuous with those of the one into which the blood is transfused, with the addition of a supplementary heart to regulate the circulation.

An "*apparatus for the performance of transfusion*" is described by Dr. GRAILY HEWITT. "The object kept in view in the construction of this apparatus is," we are told, "the rapid transference of blood from one person to another. Experience has shown that, while the rapidity with which coagulation occurs varies in different persons and at different times, two or three minutes may be always calculated on before coagulation sets in. In the present apparatus the tendency to coagulate is materially lessened by the method adopted of receiving the blood, whereby the exposure to air and contact with foreign bodies is reduced to a minimum."

For description and drawing of the instrument we must refer to the paper of Dr. Hewitt.

A case of "*fibrous tumour of the uterus*" is given by Dr. GUSTAVUS C. P. MURRAY. The tumour in this case was developed in and entirely confined to the posterior wall of the cervix uteri. This position of the tumour constituted the chief interest in the case. Dr. Churchill states, on the authority of Mr. S. Lee, who had examined seventy-four preparations in the London museums, that the cervix uteri is the rarest seat of such tumours. It is remarked that the operation of enucleation might have been performed in the case described, had it been possible to ascertain, during the lifetime of the patient, the exact position of the tumour, and how easily separable it was from its nidus.

Dr. SNOW BECK exhibited a uterus, removed from the body of a woman who

died on the ninth day after a natural labour, and who presented all the symptoms of a severe form of puerperal fever. The peritoneum after death was found inflamed, and about two pints of turbid fluid were contained in the cavity of the abdomen. After a minute and careful examination, the uterine sinuses, the pelvic veins, the lymphatics, and every other tissue were perfectly healthy. The internal cavity of the uterus was covered throughout by a soft membrane containing the usual microscopic elements of the mucous membrane. This proves that disease of the uterus is not necessary to the production of puerperal fever. But it was shown that the sinuses and pelvic veins permitted air to flow along their cavities, and a ready means thus existed for the purulent infection of the general system. This open state of the sinuses was traced to an imperfect contraction of the uterus after the birth of the child, which thus allowed fluid to pass along these canals.

The account of a case of "*Cæsarean section*," from the posthumous papers of Mr. T. E. BRYANT, was communicated by Mr. T. Bryant. The impediment to natural labour resulted from a contracted pelvis; the conjugate diameter was found after death to be, with the soft parts unremoved, only one inch and three-quarters. The operation was performed on the third day after labour had set in. The child was removed from the uterus alive. The patient died on the day after the operation. The infant survived its delivery twenty-five days.

A case of "*congenital deformity of arms and hands*" in a male pariah of Southern India, aged twenty years, is related by Dr. J. SHORTT. The young man was well formed in every respect excepting in the upper extremities.

"*Missed Labour*."—Under this head Dr. A. WYNN WILLIAMS relates three cases as introductory to some remarks on the treatment of the class of cases to which these are referred. Dr. Oldham, by whom the term "missed labour" was first employed, restricted it to cases in which the full term of utero-gestation has gone by without labour pains having set in or the expulsion of the child effected. There is a doubt whether either of the cases of Dr. Williams properly comes under this definition; that the second does not, the relator himself confesses. Waiving, however, this question, we come to the all-important one, how are cases of "missed labour," as defined by Dr. Oldham, to be treated? Dr. Williams would venture to suggest that, as soon as the accoucheur's attention is called to a case of the kind, he should, after satisfying himself of the escape of the liquor amnii, the death of the fœtus, and the dilatability of the os, after a reasonable delay and the employment of the recognized means usually adopted to cause contraction of the uterus, proceed to turn and deliver. Should, however, unfortunately, the case not come under the notice of the accoucheur until putrefaction has set in, whilst endeavouring to remove all loose portions of the fœtus, Dr. W. would recommend the syringing out of the vagina and uterus with a weak solution of iodine, about three drachms of the compound tincture to eight ounces of water. This, after some six years' experience of its effects, he can recommend as the most efficacious and beneficial disinfectant we at present possess.

In all these cases Dr. Braxton Hicks thought it highly important to be certain that the full term of gestation had really expired. This fact it was very difficult to arrive at in any case before a month beyond the expected period of labour had elapsed. In the cases recited he thought it probable, notwithstanding the death of the children, they would in due time have been expelled by uterine contractions.

Dr. Williams replied, that "as no accoucheur would, he was sure, leave a placenta in the uterus to become putrid, with the risk of noxious gases affecting the system of the patient, causing pyæmia, etc., so he conceived it to be his duty to extract a dead fœtus, having of necessity first satisfied himself that the patient had passed the proper period at which she should have been delivered, that the liquor amnii had escaped, that the fœtus was dead, and that all proper measures had been adopted for the purpose of causing expulsion of the child by exciting contraction of the uterus. As regards the extraction of the dead fœtus before the full term of utero-gestation, the question does not arise. Of course no one would think of doing so, supposing the os to be rigid and undilatable; he could only say that such was not the state of the part in the cases related by him. But he was of opinion that it would be quite justifiable to endeavour to

dilate by means of the tampon, or by incising the os, in order to extract the child. For he conceived there would be less risk to the mother in incising the os and causing a simple clean wound in the uterus, than by leaving a foetus in utero to become putrid, especially as in all the cases recorded the patients have died sooner or later."

A very graphic account is given by Mr. T. J. GANT of the "*post-mortem examination of a woman at the full period of gestation, and in the first stage of labour*." Death by accidental hemorrhage, chiefly internally." The chief interest of this post-mortem examination is that it presents a view which the obstetrician can very seldom obtain of the condition of the uterus and pelvic viscera, and of their relative position in reference to each other and to the neighbouring abdominal organs, at the end of gestation. An abstract of the paper of Dr. Gant would be of little value, it must be studied entire to derive from it the information it is calculated to furnish.

Dr. HENRY GERVIS exhibited the *bladder, kidneys, and ureters*, removed from an infant who had died at the age of five weeks, and whose death had been preceded by no other symptoms than those of a gradual decline of strength. The bladder was extremely thickened; both ureters were sufficiently dilated to permit with ease the introduction of a finger; the pelvis of the left kidney was greatly distended, and its secreting structure reduced to a narrow margin, while the right kidney was considerably hypertrophied.

There are two points of much interest in connection with this specimen. First, as to what could have constituted the obstruction, for after birth the child had no apparent difficulty in micturition, hence whatever had been the obstruction before birth must have disappeared after birth. Second, it appeared remarkable that sufficient urine should have been secreted during the last weeks of intra-uterine life to give rise to the effects of pressure simulating those resulting from a stricture of many years' standing in an adult.

At the time of making the inspection the bladder was found nearly empty, but both ureters, and especially the left, were greatly distended, although the communication between them and the bladder was unimpeded.

Mr. F. F. JAY presented a specimen of "*double monstrosity*." The children, both males, were adherent from the side of the thorax to the abdomen; the skin of the latter at its lower part was deficient, the viscera being covered with little else than peritoneum. Otherwise the children appeared to be perfectly formed. There was but one umbilical cord. Little satisfactory information could be obtained in respect to the labour, which was attended by a midwife. When seen by Mr. Jay, a few days after delivery, they seemed to have been well nourished and fine children for twins. The mother was twenty-one years of age. The father was also young.

Dr. A. RASCH describes "*a simple instrument for vaginal injections*." It consists of a long India-rubber tube, six to seven feet in length, and about as thick as a lady's little finger. It is essential that the tube should be well made and strong, to prevent its collapse. It is rendered heavy at one end by a hollow bell-shaped leaden attachment, the base of which has large grooves to allow the entrance of the fluid used as an injection into the tube from the vessel containing it. To the opposite end of the tube there is fastened an elastic, thick, hollow bougie, not less than five inches long, with several holes in the bulbous extremity.

To use the instrument, a pitcher or other vessel containing the fluid to be injected is to be placed on some high place, as a mantel-piece or chest of drawers. Into the fluid of the vessel the leaded end of the elastic tube, along with about two feet of the tube itself in a coiled form, is to be inserted. In a few seconds the immersed portion of the tube will become filled; so soon as this takes place the tube is to be compressed with the finger and thumb just over the surface of the fluid in the vessel; the compressed part is then to be carried over the brim of the vessel, and brought down on its outside below the surface of the fluid within, which is readily done by uncoiling the immersed part of the tube. By so doing we are able to establish a continuous current in the syphon that has been formed, so long as any of the solution remains. The fluid will of course be propelled out of the vaginal tube the more forcibly the higher the vessel con-

taining the solution is placed. While using the instrument, the patient should sit over a basin to receive the fluid as it escapes from the vagina.

Mr. J. BAKER BROWN relates a case of "*complete extirpation of the uterus and ovaries with large fibrous tumours.*" The patient at first seemed to do very well after the operation, but on the day following she had a severe attack of vomiting, suddenly became pale and collapsed, and died in half an hour. Examination post-mortem showed a large mass of coagulated blood in the left iliac fossa, with a quantity of serous fluid in the cavity of the abdomen. The blood had evidently come from the left broad ligament, from which the ligature had slipped during the operation, while the second one applied had not included the whole of the divided surface. In any future similar operation, Mr. B. proposes either to divide the broad ligaments with the actual cautery, or to apply a double ligature by piercing the ligament.

D. F. C.

ART. XXVI.—*Addresses Delivered before the British Medical Association at the Thirty-Ninth Annual Meeting, in August, 1865.*

1. *The Address in Medicine.* By WM. STOKES, M. D., D. C. L., Regius Professor of Physic in the University of Dublin.
2. *The Address in Surgery.* By JAMES SYME, F. R. S. E., Surgeon in Chief to the Queen in Scotland; Professor of Clinical Surgery in the University of Edinburgh; Member of the Medical Council, &c.

THE high character of the body before which these addresses were delivered, the reputation of their respective authors, and the importance of the subjects therein discussed—the changes in practice within the last forty years in the two great departments of medicine—entitle them to especial and respectful attention.

Prof. Stokes has selected for the subject of his address "the change of type; first as regards essential diseases, and next as a local affection." The professor maintained, from his own personal observation, and he adduces in confirmation of it the testimony of Drs. Alison, Graves, Watson, and Christison, "that the character of diseases has in our time changed from a sthenic to an asthenic type; that is to say, from a condition in which inflammatory reaction was the prominent feature, to another where that state was absent, or, if present, only ephemeral—a condition observable in essential and in local disease, in which the antiphlogistic treatment was well borne and productive of great relief, to one in which a tonic and stimulant and supporting system was found the best method of guiding the disease to a happy termination."

We can add our own testimony to the fact of the same change of type having occurred in the diseases of this country. Connected with the profession for nearly half a century, we can testify that the prominent characters which we witnessed in fevers and inflammation during our studentship and the early years of our practice are no longer seen. The burning heat of skin (*calor mordans*), the injected eyes, intense headache, flushed face, and tendency to wild delirium, for which free venesection afforded such marked relief, are no longer characteristic of our fevers.

The high testimony of morbid anatomy is further adduced by Prof. Stokes in confirmation of the truth of his views.

"The Pathological Society of Dublin," he states, "has been now established for twenty-six years, during which time it has held weekly meetings for six months of each year. As one of the secretaries of that society, I have had full opportunity of seeing and examining the recent examples of diseased structure brought weekly before the body—amounting to nearly 3000 specimens—the collected products of various hospitals of the city; and this result is remarkable, that the specimens of acute disease have had a character very different from that commonly met with in Dublin between 1820 and 1830. As a general rule, these specimens all showed appearances indicative of a less degree of pathologic

energy. In pneumonia, for example, the redness, firmness, compactness, and defined boundary of the solidified lung was seldom seen; and that state of dryness and vivid scarlet injection, to which I ventured to give the name of the first stage of pneumonia, became very rare. In place of these characters, we had a condition more approaching to splenization—the affected parts purple, not bright red; friable, not firm; moist, not dry; and the whole looking more like the result of diffuse than of energetic and concentrated inflammation; or we had another form, to which Dr. Corrigan has given the name of blue pneumonia, in which the structure resembled that of a carnified lung which had been steeped in venous blood.

“Let us turn now to the serous membranes, and the same story is repeated. The high arterial injection, the dryness of the surface, the free production, close adhesion, and firm structure of the false membranes in acute affections of the arachnoid, pericardium, pleura, and peritoneum, with which we were so familiar before the time in question, ceased, in a great measure, to make their appearance. The exudations were more or less hemorrhagic; the effused lymph lying like a pasty covering rather than a close and firm investment; it was thin, ill defined, and more or less transparent. In many of such cases, during the disease, as the late Dr. Mayne has shown in his memoir on pericarditis, friction-sounds were never presented. Serous or sero-fibrinous effusions tinged with colouring matter replaced the old results of sthenic inflammations, and all tallied exactly with the change in the vital character of the disease.

“It has happened to me—and I mention this in evidence that we were not mistaken as to cases peculiar to the sthenic form—that a few instances of disease in its old inflammatory characters have appeared in isolated examples, and at irregular intervals of time; so that we at once recognized their nature, and employed with success the old treatment in all its vigour—employed the lancet, although for many years its use had not been resorted to. This is very important, as showing that there are influences, the nature of which is as yet unknown, that affect the vital character of local diseases in an inconstant manner.”

Prof. Stokes brings to bear on the doctrine of change of type, the great sources of evidence as to the nature of disease, first, the study of the vital symptoms; second, the study of the characters of the anatomical changes induced by disease; third, the result of therapeutical experiments.

“Looking,” he observes, “at the question from any one of these points of view, we come to the conclusion that the doctrine of change of type is a true one; while, if we take all these facts, and observe how they point to the same conclusion, we must, to use again the words of Alison, accept the change of type as an ultimate fact in the history of disease.

“But are we to conclude,” asks Prof. S., “that this asthenic type of disease is always to continue? Are we to forget that in our own time we have witnessed its advent and growth? Is it not possible—nay, probable—that we or our successors may witness its disappearance, and, coincidently, the return to an anti-phlogistic medicine, regulated and tempered by the advances in diagnosis and pathology which have been meanwhile made? I have given you the opinion of Dr. Christison on this matter; let us now hear Dr. Watson:—

“‘I am firmly persuaded by my own observations, and by the records of medicine, that there are waves of time through which the sthenic and asthenic characters of disease prevail in succession, and that we are at present living in one of its adynamic phases.’

“It is very important that the change of treatment of fevers and acute local disease be traced to its true sources. This change has not proceeded from any advance in our knowledge of physiology or of pathological anatomy, nor from any new principles of practice announced as applicable to all time, and therefore implying that our predecessors were groping in the dark, or wilfully and ignorantly following a system of traditional error. To each one of us the honour of our profession, which includes its scientific character and its power of development out of itself, has been intrusted. Medicine, like other professions involving human interests, has been continually assailed from without, and harmlessly. Attacks on her honour proceeding from her own children, no matter what amount of ability may be shown, while they inflict a deeper wound, ever recoil upon

their authors. This has been well exemplified in the case of Paracelsus, who burned the books of the Greek, Roman, and Arabian physicians. It is well exemplified in the case of Broussais, who, in speaking of the eclectics, spares no term of contempt."

Prof. Stokes has treated the subject in a most philosophical spirit and with a kindliness of feeling which is as creditable to his head as to his heart. "There is no more decided evidence of an unexpanded mind in our profession," says our amiable author, "than the decrying the knowledge and usefulness of our predecessors." He evidently is one of those "that love their fellow-men."

Prof. Syme discusses his subject in quite a different spirit from that displayed by Dr. Stokes, and which clearly shows that he is not a disciple of Abou Ben Adhem. Prof. Syme dissents entirely from the views of Prof. Stokes, that the disuse of bleeding is due to a change in type of diseases, and maintains that it is to be attributed to the influence of more correct ideas in regard to the treatment of disease. He gives a dismal account of the abuse of bloodletting at the fever hospital when he was medical superintendent, under the direction of the attending physicians who were professors of the University; and then successively notices many of the improvements made in the practice of surgery. These changes he has sketched in so graphic a manner that the whole address may be read with interest and profit.

It cannot fail to strike the reader that while Prof. Syme has carefully enumerated all the improvements in the practice of surgery introduced by himself, he has but cursorily alluded to, or altogether ignored, many which are generally considered as equally valuable improvements made by his contemporaries. He claims to have anticipated M. Ollier in the discovery of the function of the periosteum in the production of bone. Admitting the justice of this claim, the greater credit must still be awarded to M. Ollier of more fully elucidating the subject, of having had the sagacity to clearly perceive the important application of it in practical surgery, and of having aroused to it the attention of the profession.

Prof. S. observes: "With regard to the pathology of the osseous system, instead of the vague and erroneous ideas entertained forty years ago respecting the formation of new bone, we now possess a clear understanding of the source from which it proceeds. My probationary essay on necrosis was written with the view of showing that the periosteum had nothing to do with ossification; but, ten years afterwards, I was led by the observation of some facts in practice to take an entirely different view, and to perform experiments which completely removed any doubt that could have remained on the subject. By detaching the periosteum of dogs, and either removing the denuded bone or surrounding it with tinfoil, I obtained results that proved beyond all question the periosteum to be the great agent of osseous reproduction. Of late years much attention has been devoted to this subject in France, especially by M. Ollier, who came to Edinburgh with his preparations of rabbit-bones, and was not a little surprised to find them anticipated by my own from dogs, which had been made and published twenty years before.

"Our knowledge of the ossifying power which is possessed by the periosteum has improved the treatment of necrosis, and led to other applications, of which the one most worthy of notice is that employed for the remedy of fissure through the hard palate, where, by detaching the periosteum and obtaining sufficient relaxation of the dense superjacent textures by means of lateral incisions, we are enabled not only to close the gap, but to do so by the formation of new bone."

The manner in which Prof. Syme ignores all that has been done in this country for ovariectomy is not less remarkable than the severity of his criticisms of the early operations of that kind performed by his townsman, the late Mr. Lizars. We quote his remarks:—

"We now come to ovariectomy, which has of late been the subject of so much attention; and it will here, perhaps, be supposed that a claim for the honour of priority may be advanced on the part of Edinburgh, where the operation was first performed. But, to confess the truth, I fear that the northern metropolis,

so far from deserving any credit on this account, should rather plead guilty to having invested the procedure with an aspect so repulsive as to impede rather than promote its adoption. It was brought forward by the same person who had proposed to remedy hypertrophy of the heart by blowing air into the pericardium, to puncture the brain in acute hydrocephalus, and to treat enlargement of the prostate by cutting out the entire gland; so that the profession in Edinburgh were not either disposed to adopt the excision of ovarian tumours, or at all surprised by the results of its attempted performance. From these it appeared that one woman was laid open from sternum to pubes without any tumour being found; that another so treated presented a mass of disease entirely beyond the reach of removal; and that a third, after having what was supposed to be an ovarian tumour extracted, was found, on dissection a few days afterwards, to retain both ovaries in a healthy state. These and similar cases, so ludicrous, if they had not been so shocking, led surgical teachers to conclude that the operation laboured under three serious objections—1. The uncertainty of prognosis; 2. The difficulty of diagnosis; and 3. The danger of execution; whence it happened that, notwithstanding more favourable reports that after a time reached us from Manchester, with the exception of a few cases, all of which proved fatal, no further attempt was made in Scotland to establish the procedure until a recent period, when the successful experience of some gentlemen in London, and more especially Mr. Spencer Wells, gave the matter an entirely new position. The objections originally entertained with regard to both prognosis and diagnosis have been in a great measure removed through the careful discrimination of cases, while the operative procedure has acquired a corresponding degree of perfection, and the results are so satisfactory that the proportion of deaths does not exceed from 30 to 35 per cent. The most successful operator in Scotland is my friend and former House-Surgeon, Dr. Thomas Keith, who has operated in thirty-two cases, and lost only nine of his patients."

It is remarkable that Mr. Spence, the newly-elected Professor of Surgery in the University of Edinburgh, also ignores, in his inaugural introductory lecture, the operations for ovariectomy by Dr. McDowell, of Kentucky, performed previously to those of Mr. Lizars. Whether this arose from ignorance or a desire to flatter his Scottish auditors we leave to the reader to decide. The true history of the operation will be found on page 391 of our No. for April last.

We commend the address of Prof. S. to the attention of our readers, for though we cannot admire the spirit displayed by the author, much useful information may be gleaned from it.

ART. XXVII.—*Lecture on the Importance of the Application of Physiology to the Practice of Medicine and Surgery.* (Dublin Quart. Journ. Med. Sci., May, 1865.) By E. BROWN-SÉQUARD, M. D.

THIS extremely interesting lecture was delivered before the Medical Society of the College of Physicians of Dublin. The aim of the author is to show that by the knowledge derived from experiments on animals, as well as from that derived from other physiological researches, from the knowledge we derive from microscopic anatomy, and even from simple descriptive anatomy—especially as regards the base of the brain—combined with the careful study of pathological cases at the bedside, may be drawn a great many conclusions of importance to the practice of medicine, and we may be led to form a sure diagnosis in many otherwise obscure cases.

The lecture is so condensed that it is impossible to do justice to it by any abstract; and the subject is so interesting, and is treated in so masterly a manner, that our readers will be pleased to have laid before them the main portion of the text.

The author observes: "A complete revolution has been made in the practice of medicine within the present century by the study of experimental facts observed upon living animals; and if, together with this source of knowledge

and that which springs from the comparison of those facts with morbid cases in our own species, we make an appeal to the other branches of physiology and also to normal anatomy, especially that of the nervous centres and of the nerves at the base of the brain, we shall find that to understand the symptoms of a large class of pathological cases in our own species becomes almost as easy as to read the alphabet. In fact, many of the most complicated, the most obscure, and the most unintelligible cases of nervous disease are as easily understood as the simplest case of bronchitis, or any other simple affection of the lungs, the bowels, &c., if we have the advantage of the light which experimental physiology and the anatomy of the base of the brain now afford.

“Suppose, for instance, a patient comes to us suffering from paralysis, an absolutely complete paralysis of the motion of one-half—say the right half—of the body, from the neck downwards. Suppose that, in addition to this paralysis of motion, he has also, on the same side, extreme hyperæsthesia or increase of sensibility in all those parts which are struck with the paralysis of motion. Suppose that we find not only extreme sensibility to touch—a symptom which we may measure accurately with a pair of compasses or the æsthesiometer—but also an extreme sensitiveness to tickling—a sensibility, by the way, quite distinct from the other. Let us suppose that we find, besides all this, that the sensibility to a prick or a pinch—in fact the sensibility to painful impressions of every kind—likewise the sensitiveness to changes of temperature—cold and heat—is also much increased. Thus you have these four species of sensibility—each of which, I repeat, is entirely distinct from the others—all greatly increased in that limb, which, at the same time, is apparently dead, inasmuch as it does not possess the least power of motion. Suppose further, that in the limbs and part of the trunk in that same side of the body the temperature is found greatly increased, that the circulation of the blood in that side is more energetic, the arteries being *fuller*; or, in other words, that there is decidedly more blood there than elsewhere in the body.

“All these symptoms, observe, belong to one side of the body—the *right*. If, now, we compare them with what we find on the opposite side, they acquire still greater interest. On examining the *left* side of the body, we find an absolutely reverse condition. We find that all the four species of sensibility of which I have spoken are lost—absolutely gone—on that left side. We find that there is, on that last side (in opposition to the state which exists on the right side), a complete power of motion, not the slightest diminution of the power of the will.

“Suppose we go further, and inquire into the condition of the *fifth* kind of sensibility (assuming that their number is only five); if we look for the special sensibility existing in the *muscles*, that sensibility which serves to the direction of our movements, we find that this peculiar sensibility remains perfect in the limbs of that left side, and that the motions of weight, of resistance, &c., derived from the muscular sense, also remain perfect in those otherwise anæsthetic parts. There is, therefore, on the *left* side a complete anæsthesia of the four first kinds of sensibility of which I have spoken, notwithstanding the persistence of the muscular sense; while on the *right* side the condition is exactly the reverse—the muscular sense is gone, and the other four species of sensibility exist in a greatly increased degree.

“But what about the degree of heat in the limbs of the left side, and what of the circulation? Here, too, the condition of things is reversed; for on the left side there is not only a degree of heat much inferior to that on the right side of the body, but there is also an actual diminution of heat if you compare the state of those parts with their normal condition; in other words, there is an *absolute* not simply a *relative* diminution of heat on the left side. Thus, on the right side, the temperature of the body has increased, while on the left it has diminished. The case is similar as regards the circulation, which is less full in the left side than in a normal state.

“These features, I think you will agree with me in saying, are striking enough; yet there will be many others in the same individual, upon which I cannot now dwell, but which are fully as interesting and equally difficult of explanation by the practitioner who is not perfectly *au courant* with the present state of physiological science.

"In the face (for example), on the side of the injury (admitting that an injury is the cause of these symptoms), there will be an increase of heat, an increase of sensibility, a contraction of the pupil, and a degree of occlusion of the eyelids; so that the eyes of the patient—if you look at them at the same time while open—are quite different one from the other. The eye on the side of the increased heat and hyperæsthesia seems smaller, because the opening of the eyelids is smaller than on the other side.

"All these effects we can produce in animals very easily; and it has been (in some respects) my good fortune to find a number of such cases in our own species. One of the most striking of them I saw at the London Hospital, in company with my dear and talented friend, Dr. Robert M'Donnell; in that case the various symptoms which I have described were as marked as possible.

"Now, what was the injury which produced all these remarkable effects? It was simply this—a complete transversal division of the right lateral half of the spinal cord in the neck; not simply a part, but, I repeat, the entire lateral half, *i. e.*, the posterior column, the lateral column, the anterior column, and the gray matter of that side had been divided transversely and completely. Owing to that injury all those symptoms existed.

"Now, I ask you, if any physician at the beginning of this century—not having the light afforded by the present state of physiological science, no matter how learned and able in other respects—had such a good living problem been presented to him, would he have been able to understand such a case? Decidedly not. Nay more, he would, in all probability, not have seen the case as I have described it. He would not have recognized the existence of some of the symptoms. He would likely have fallen into the same error as was committed by the great French surgeon, Boyer, who had such a case, but who never found that the sensibility was lost on the side still under the power of the will, until the nurse, who discovered the fact by a mere chance, told him of it.

"From such facts you will see the great importance of a thorough knowledge of physiology. The physiologist can have no difficulty in understanding such a case, for when he knows that the spinal cord is the organ conveying the orders of the will to the muscles—that the nerve-fibres, serving for voluntary movement, proceed along the spinal cord, so that those which serve for the movement of the limbs on the right side of the body pass along the right side of the cord, while those serving for movement of the limbs on the *left* side of the body pass along the *left* side of the cord; it is quite evident to him that such a division of the cord as I have described will cause loss of motion on one side and not upon the other. Again, the sensitive nerve-fibres which serve to the four first kinds of sensibility of which I have spoken, proceed in the spinal cord in such a manner as to go into the *opposite* side of that organ from that side of the body from which they convey the sensitive impressions—so that the nerve fibres of sensibility in my right arm and right leg, for instance, pass into the left side of my spinal cord, and *vice versa*. Hence a division of the cord produces loss of sensibility on the side of the body opposite to that of the injury.

"Equally simple is the explanation of the increase of heat in the limbs on the side of the injury. The nerves of bloodvessels pass into the spinal cord on the side corresponding to that of the limbs into which they go, just as is the case for the nerves of voluntary movement, so that a division of the spinal cord on the right side produces paralysis of the nerves of bloodvessels in the right side of the body, in consequence of which, the impulse of the heart being less resisted on that side than on the other, there is a greater afflux of blood, and also, as an effect of this increased quantity of blood, an increased heat, and (as a consequence of both the increased heat and the augmented quantity of blood) in a measure, also, the increased sensibility of which I have spoken—the hyperæsthesia of the four kinds of sensibility.

"I cannot further dwell on this class of cases. Sufficient has been said, I hope, to show how important the light physiology can throw on symptoms which certainly would have been most obscure (to say the least) to even the most eminent and learned men of the beginning of this century, who did not know the physiological facts which have since been discovered.

"I will now produce another case. Let us suppose a man has sustained an injury, not of the half of the spinal cord, but an injury of one-half of the medulla oblongata at the level of the decussation of the anterior pyramids; not such an injury as would destroy life at once, but an injury, a tumour, or a morbid alteration of sufficient extent to produce decided symptoms. In this case you would have all the symptoms which I have described in the former case, but with this difference, that as the anterior pyramids decussate there, an injury on the right half of the medulla oblongata would strike the fibres of voluntary movement belonging to that side previous to their making their decussation, or, in other words, before they pass from the right side into the left side; and it would also strike these fibres of voluntary movement that have come from the left side and have already made their decussation. In this case, therefore, there would be paralysis of motion on *both* sides of the body, while, as regards the state of the bloodvessels, the hyperæsthesia and the anæsthesia of the various kinds of sensibility, everything would be the same as in the former case.

"Let us take, now, a case of injury a little higher up, and we shall find other striking differences.

"A patient, I suppose, comes to you with paralysis of the external rectus of the eye on the right side. The face is also paralyzed on the same side. There is, besides, anæsthesia of the face on that side; while the left side of the body is affected with paralysis both of sensibility and motion. Here there is a case absolutely distinct from both the others. I cannot dwell, at length, on the remaining symptoms of the case, but I must not pass from it without noticing one most striking feature. You will often find, in such cases, that the tongue of the patient is perfectly free; there is no loss of movement at all in that organ, and there is no impediment of speech. You will find that the facial paralysis is of exactly the same kind as that which takes place when the facial nerve, outside the cranium, has been injured—*i. e.*, the muscles which communicate expression to the face and the orbicularis palpebræ are paralyzed. This case, therefore, is quite distinct from cases of hemiplegia arising from disease of the brain. As you are aware, in cases of paralysis arising from injury to the brain, the paralysis of the face is on the same side with that of the body, and the orbicularis is not paralyzed, while the tongue is almost always somewhat paralyzed. In the case I am now speaking of, the distinction is striking. The drawing of the face on one side, owing to the paralysis of the other side, takes place on the side of the paralysis of the body instead of on the other side—because the paralyzed side of the face is the opposite to that which is usually paralyzed. Besides all this you will find that the sense of taste is altered in a good part of the tongue, on the side at which the face is anæsthetic. You will find further that the patient is in a state of considerable emotion—he will shed tears and cry easily; he will gape frequently, and while gaping there will frequently be a sudden jerk of the paralyzed limbs. There is also, generally, considerable giddiness and tendency to vomit. I am now mentioning only the principal symptoms.

"Now, I ask, what is the explanation of this case? Do you think that the most eminent men of the beginning of this century, not knowing the sciences of physiology and anatomy as we now know them, could have understood this case? Certainly not; and thus, you perceive, an acquaintance with physiology and anatomy is an immense help in the diagnosis of disease.

"The series of symptoms I have last described belong to a case of injury of the *pons Varolii*, striking, at the same time, one side of the trigeminal and of the facial nerves before they have made their decussation, which is at the lower part of the *pons Varolii*, and striking, also, one side of the sixth pair of nerves before it has made its decussation with its fellow of the other side, thus producing paralysis on the side of the injury just as if the injury existed in the nerve itself. You must not, however, suppose that an alteration of the *pons Varolii* will, under all circumstances, produce these effects. If the injury takes place a little higher up than the lower part of the organ, striking at the place where the facial nerve and part of the trigeminal nerve make their crossing, you will have these results: both sides of the face will be paralyzed, as regards sensibility and motion, together with the action of the external recti of the eye, and also the sense of taste in

the anterior part of the tongue, while the paralysis of sensibility and motion in the body will be only on one side. In order to understand this it is quite sufficient to keep in view what the nerves of the face do when they reach the pons Varolii. When the injury strikes that nervous centre above the decussation, you will have, so far as regards the portions of the face and body which are paralyzed, the same effects as are observable in most cases of brain disease, viz., the paralysis of the face will be on the same side with the paralysis of the body. If, on the other hand, as already stated, the injury strikes the pons Varolii below the decussation, the opposite effects are produced.

"The question arises, therefore, how can you know whether the seat of the disease is in the pons Varolii if you have not that peculiar symptom of the difference of the sides, as regards the paralysis of the face and that of the body? There are several peculiar features, which I cannot dwell upon, which will answer that question. In the first place, if the injury is in the pons Varolii, you will find in the beginning of the affection one most important symptom, viz., extreme coldness of that side of the body which is to become paralyzed after a time, just the reverse of what will occur when the paralysis is complete, owing to a spasmodic contraction of bloodvessels preceding their paralysis and dilatation.

"I remember on one occasion, after one of my lectures at the Royal College of Surgeons in London, that eminent physician, Dr. T. Addison (whose modesty, like that of almost all truly great men, was in proportion to his great talents and extensive learning), did me the great honour of asking my opinion upon a case in which the symptoms were, besides the extreme coldness, already mentioned, in one half of the body, some tingling in the fingers, a very slight ptosis of the external rectus, some jerks in the muscles of the face, on the side opposite to that of the injury (this is a symptom you do not find when the injury is higher up than the pons Varolii), also some sensations of tickling in the face (another symptom you do not find in cases where the injury is higher up than the pons); in fact the symptoms were such that although, as observed in the human species, they were new to me, who was at that time more of a physiologist than a practitioner, I had no hesitation, simply from the teachings of physiology, in pronouncing the case to be one of disease of the pons Varolii; and so it proved, as it gradually and successively presented all the symptoms which I have mentioned as characteristic of disease of that organ. As I had not, however, the advantage of making an autopsy of the case, you might think me very presumptuous in holding that I had made a certain diagnosis; but really with this class of cases doubt is impossible, when the symptoms are combined, forming a group so definite and distinct that there is absolute certainty, even during life, as to their cause. It is not so when the disease goes higher up in the brain; we are then often at a loss, and it is extremely difficult to say, even, whether there is organic disease or mere temporary disorder of the circulation, and still less is it possible to say what part of the brain is the seat of the disease.

"I pass on to the consideration of another kind of hemiplegia. There is one kind of that paralysis perfectly distinct from all those which I have mentioned. We will suppose a patient comes to you with some slight stiffness and tendency to throw his limbs in a wrong way when he walks. There is not a very great paralysis, but rather a decided weakness, and hardly any loss of sensibility on one side of the body. He complains also of noises in the ear on that side, of feeling extremely giddy, and of having sometimes a tendency to turn round upon himself, like a top. Sometimes he reels as if he were intoxicated. He very frequently finds it impossible to walk straight forward. Sometimes, also, he has very great hyperæsthesia to sounds; at times, also, he has a sudden tendency to fall down—it seems to him as if he cannot keep up, and that he must fall; also, that if he takes hold of something he will keep up.

"This class of cases is, indeed, one of the most instructive of all kinds of hemiplegia. I have now collected more than twenty-two such cases—not all seen by me. According to the autopsy which has been made in a number of these cases, they are simply instances of reflex paralysis, not paralysis arising from the alteration or destruction, or, in fact, from any interruption of the conductors of voluntary motion—the paralysis in these cases is due to quite another cause. In this class of paralysis there is disease either of the petrous bone or of the

base of the brain near the origin of the fifth pair of nerves, or near the place of entrance of the auditory nerve. There is, in this case, not a destruction but an irritation by a pressure (and not a very considerable pressure) on the crus cerebelli, or a small part of the pons Varolii, or the medulla oblongata. Place a tumour there which has encroached slightly and gradually on the parts of the base of the brain I have named, and the symptoms I have mentioned will appear. But let the injury go further, and the paralysis on one side of the body, viz., the side where the injury exists, will disappear; and yet the injury to the brain is greater now than it was before. From the moment that a real disorganization has taken place in the base of the brain the symptoms which existed at first disappear, and the paralysis passes from the right side of the body to the left side—the tumour being at the right side.

“I regret that I cannot, owing to the limited time at my command, explain the causes of this at length; but I shall endeavour to do so in a few words. At first, in a case of the kind I speak of, there is an irritation starting from the injured part or parts, acting in the same way to produce a paralysis or an irritation from a nerve in any part of the body which causes a reflex paralysis. Acting upon the brain, it produces, by a reflex influence, an alteration of some kind which the microscope has, as yet, been unable to detect, and owing to which is due a paralysis. But why is it that, if the disease at the base of the brain progresses, the paralysis disappears on the side first affected and appears on the opposite side? The explanation is this: The part which, in the first place, was irritated, has now been destroyed altogether; there is no more irritation, and the paralysis consequently ceases on that side, but it passes to the other side of the body, because in the pons Varolii and medulla oblongata there are conductors of voluntary motion passing above their decussation to go up to the brain; and hence, if an injury takes place such as to destroy some of these conductors, there will be paralysis on the opposite side of the body.

“I intended bringing forward several other types of hemiplegia to show the great assistance physiology affords in explanation of such cases, but I am compelled to be brief. I must, however, mention one other species of hemiplegia—that due to hemorrhage in the cerebellum. In this case there are features which lead to accurate diagnosis; and many of these features have been discovered by experiments upon animals. One of these symptoms is vomiting; this is a constant feature of hemorrhage in the cerebellum. There may be also hyperæsthesia in some parts of the body—not the whole body, or even half, but in some portions. There will often likewise be amaurosis; this is generally due, not to pressure on the tubercula quadrigemina, as has been stated, but to a reflex action, as in the majority of cases there is no pressure whatever upon the tubercula quadrigemina. That it is due to a reflex action appears still more clearly when we consider what occurs in many of these cases; we may find the amaurosis existing in the left eye alone, in the right eye alone, or in both eyes—nay more, we may find amaurosis passing alternately from one eye to the other in the same patient, although in all those cases the disease is only in one-half of the cerebellum, showing, in fact, that there is no persistency or uniformity of action in the production of amaurosis in these cases; or, in other words, that there is the variety we know to exist in effects due to a reflex influence.

“There is another kind of hemiplegia as to which I must say a few words—I mean that which is due to a lesion of the anterior lobes of the brain. Phrenologists, you know, have regarded the anterior lobes as the organs of speech; but there have been many instances—Dr. Stokes mentioned a very remarkable one to me a few days ago—in which there has been destruction of these parts without any deprivation of speech. But the question remains (and it is an interesting one), what occasions the loss of speech when such loss takes place? As regards this question I shall, in a moment or two, have to point out how great a variety of symptoms may be produced by a lesion of almost every part of the brain. The deprivation of speech I hold to be a reflex phenomenon; and that it is so, we have almost a proof in the fact that it often varies very much in the same patient, according to circumstances which physiology has, as yet, been unable to detect, but certainly with the lesion of the brain still continuing unaltered. It is worthy of remark, too, that the loss of speech is usually

unaccompanied by any loss of movement in the tongue; there may be perfect freedom of motion in the tongue, and the deprivation of speech arises from the circumstance of the patient being *unable to give expression to his thoughts*; and this inability extends not merely to speech, he is equally powerless to express ideas either by signs or by writing. The paralysis, in fact, is a 'paralysis of the organ of expression of ideas;' and it is remarkable that this occurs, while the individual may remain, in other respects, in full possession of his intellectual faculties, at least so far as we can judge of this possession. One of the cases of that kind I have seen was that of a clergyman, a man of remarkable intelligence. He had not lost the mechanical part of the power of speech, for he articulated a few words very distinctly—but they were sounds devoid of meaning; he was equally unable to express his thoughts by writing, or even by signs. Even when he was told to express 'yes' by lifting up one finger, and 'no' by lifting up two fingers, he was unable to do it, and showed signs of great distress at his inability; and all this, although he appeared, in other respects, very intelligent.

"I pass on to notice another form of disease showing the importance of a knowledge of physiology. It is a form to the discovery of which I have been partly led by experiments on animals. A patient may come to you complaining of pain in the back, of a pricking sensation in both arms, with some degree of itching, burning, or some subjective sensation of alternate cold and heat, or some curious variety of cutaneous eruption, different from those you have usually to deal with when they are not due to nervous disease. You may find, also, some weakness or even a great paralysis in the two upper limbs; jerkings in those limbs, likewise a stiffness in some of the muscles, and tenderness under pressure. If you do not know the physiological meaning of all these symptoms, you will be led to suppose that there is some local affection—rheumatism, perhaps, of both the arms. You will think it very strange that you can find no description of any such disease in books—yet the explanation of all these phenomena, when read by the light of physiology, is very simple. The symptoms depend altogether on an inflammation of the nerves of the arms at or before their exit from the spine in the lower cervical region and the upper dorsal region. This neuritis is usually accompanied by a local spinal meningitis; all the symptoms arise from irritation of the motor and sensitive nerves, and also of the nerves of blood-vessels. If, then, you meet such a case as I have described, and applying your physiological knowledge you arrive at the true character of the injury, you may, by adopting a certain course of treatment, cure, or, at all events, greatly mitigate the disease. I have met many cases of the kind; and, with the exception of one, which I saw in consultation with Mr. W. Adams, of North London, and which terminated in death, all the cases have been either cured completely or more or less ameliorated. The treatment consists in a most active blistering of the spine in the region of the disease; also, in the application of dry cupping. Injections of narcotics have also been resorted to; but I repeat that the principal part of the treatment consists in the repeated application of blisters to the spine. Internally I have also employed iodide of potassium; but what share it has had in the cure I do not know.

"I intended to have brought forward many varieties of cases of disease of the spinal cord, but time does not allow of my doing so. I will, however, say that physiology has demonstrated these most important facts—that the spinal cord, in its most central part, which is decidedly insensible and inexcitable in its normal state, may become exquisitely sensitive and excitable under the influence of inflammation or congestion, and that when the gray matter has become sensitive, it may occasion all those strange sensations and other symptoms complained of by patients attacked with either myelitis, or great congestion of the gray matter—viz., pricking as by pins and needles, formication, itching, feeling of heavy pressure, or tightness, coldness, or heat, &c., and jerks, trembling, cramps, convulsions, contraction, &c. In cases of paraplegia this group of symptoms is generally due to a special alteration in the condition of the spinal cord; and the part of this group concerning sensation cannot be produced without congestion or inflammation, and characterize essentially these two diseases, especially the latter; and if you do not find them in cases of paraplegia, you may be convinced that the spinal cord is free from congestion, and still more free from inflammation.

"Keeping in view the object of this lecture, viz., the importance of a deep knowledge of physiology in the practice of medicine and surgery, I now proceed to notice the distinct and almost opposite features of two cases of fracture of the spine in the cervical region. Two patients, I suppose, are brought to you—each having sustained an injury of that portion of the spine, and having, in consequence, a complete paralysis of the trunk and limbs. One of them is almost pulseless, extremely cold, and covered with a clammy perspiration. He appears almost like a dead man; there is no contraction of the muscles, the limbs hang loose and dead, his breathing almost gone, his pulse—not only very faint, but extremely slow—from 40 to 45 in a minute. If you commit the fault of bleeding him, you find that the venous blood flows out red like arterial blood—flows out, not with a great impulse, for the heart is very weak and almost in a state of syncope, but still it flows out not like venous blood—it has an impulse like arterial blood.

"Now examine the other patient. In him the symptoms are almost the exact contrary to those in the former. The limbs are stiff and rigid; the pulse unnaturally high; the heart's action much excited; the heat of the body, not only higher than is usual in the limbs, but absolutely higher, and by many degrees, than the temperature of the blood in health in man. If you bleed him, which may prove useful, you find that the venous blood is darker than usual, and comes out without any trace of impulse.

"Now what is the explanation of these two cases? How is it that one of these patients is in a state of syncope, and the other in a state of asphyxia? It is found, by experiments performed upon animals, that in the former of these two cases the cause is an irritation—perhaps extremely slight, for the slightest prick may be sufficient—of the spinal cord, the effect of which is a stoppage of the heart's action, so that it beats with diminished force and rapidity, and as a consequence of this condition of the heart all the other symptoms above described ensue. In the other patient, on the contrary, the spinal cord has actually been cut across altogether, and the patient is in a far *worse* state, in reality, though he *seems* to be far more alive than the other. He *seems* to have the power of reaction which we wish to find in patients, yet the danger of his state is far greater—in fact, he is sure to die, while the other, by means of an operation (trephining, or resection of the spine, an operation which was performed by Dr. R. M'Donnell, to-day, upon a patient in this city), may possibly survive.

"I proceed now to make some remarks on symptoms of brain disease. As you are aware, our view of the symptoms of disease of the brain proper—*i. e.*, the cerebral lobes—is that an injury there produces paralysis by striking the organ of the will, that there is a paralysis of the will at least for that part of the body which is paralyzed, and that if other symptoms occur, they are due also to a loss of function of the part altered in the brain, or to pressure upon neighbouring parts. I have not time fully to demonstrate that the symptoms of brain disease are generally due to a reflex action, but I shall show (I hope satisfactorily) that the admitted view is absolutely untenable. You are all familiar with the great variety of symptoms presented in brain disease. Take for instance facial paralysis. In cases of disease of the brain, paralysis (as you know) does not exist in the orbicularis, but in the other muscles of the face. Now if it is alleged that when in cases of disease of the anterior lobe of the brain, for instance, there is facial paralysis, it is because the nerve fibres of the facial nerve go to that part. I am perfectly willing to admit it; but let us take a case of injury to a different part of the brain—say, for instance, an injury in the posterior lobe—how will you explain facial paralysis in this case? Do the nerve fibres of the facial nerve go to the anterior lobe in one case, and to the posterior in the other? Surely not. In fact, the consequence of such a hypothesis would be that there is absolutely no part of the brain which would not be the spot to which the nerve fibres of the facial nerve go. If you can suppose such a hypothesis possible, I ask you to reconcile the facts with what anatomy teaches—*viz.*, that the facial nerve goes to a certain part of the pons Varolii, and no higher; so that besides the absurdity of supposing that the facial nerve goes to every part of the brain, and each part containing all these fibres, there is likewise the anatomical impossibility which arises when we examine the course of

the facial nerve. Again, take another instance. The tongue, as you are aware, is in most of these cases of disease of the cerebral lobes more or less paralyzed; there is some difficulty in drawing it out in a straight line—also some slight impediment in the speech, owing to paralysis of some of the fibres of the ninth pair of nerves. How will you reconcile the existence of that paralysis in the majority of cases with the fact that we do not see the fibres of the ninth pair—the hypoglossal nerves—going up higher than the medulla oblongata? Here is a patient who has a complete destruction of one-half of the pons Varolii; mark, that that organ must be the place of passage—if there is any such passage—of the fibres of the hypoglossal nerves going up to the brain. Therefore when one-half of the pons is diseased there must be a paralysis of the tongue; yet in most cases of disease of the pons there is no paralysis of the tongue, so that both anatomy and this clinical fact prove that the hypoglossal nerves do not go to the cerebral lobes. How, then, you will explain the fact that disease in *any* part of these lobes may (as we know, by experience, it does) produce paralysis of the hypoglossal pair of nerves, I leave to you to decide. To me, it seems clear that to hold that when an injury to any portion of the cerebral lobes causes paralysis of the ninth pair, or of any other nerve, it is because the paralyzed nerves go to that part of the brain, is decidedly wrong. If you examine a number of cases of brain disease, especially of an acute character, such as cases of quickly enlarging tumours producing irritation, and especially tumours pressing on the dura mater, you will find that for a tumour in one and the same part of the brain there is, in some cases, no symptom at all produced, while in other cases you may find any symptom whatever. I do not think you could point out any feature of nervous complaint that you will not find existing in some one or other of the recorded cases of injury to, or disease of, any particular part of the brain. Nay more, even in one and the same individual, with one and the same persistent disease, you will often have a great change in the symptoms. He may be paralyzed to-day, another day he may not; you may, in fact, have every variety of phenomena or no phenomenon at all, all arising from one and the same cause; so that unless you go the length of supposing that each individual part of the brain possesses every function whatever, and has the effect of acting on every part of the body in a direct way, you cannot explain these facts. Mark, that in some cases of injury to, or disease of, the cerebral lobes, there are no phenomena at all; so that while on one hand you are driven to suppose that there is no part of the brain which does not contain all the nerves of the body, you are on the other hand forced to conclude that there is no part of any nerve of the body going to the cerebral lobes. Such a hypothesis is obviously impossible. I have time only to say that the explanation which I have ventured to offer of these phenomena is, that they come under the class of effects produced by reflex action.

“I shall now pass to quite different cases, but also due to a reflex action, and I will first speak of syncope when induced by a blow on the stomach. Experiments on animals have shown me that in these cases the syncope is produced by a reflex action through the abdominal sympathetic ganglions, the spinal cord, and medulla oblongata, and, at last, the par vagum. I have often and often tried the experiment on animals of crushing the ganglions of the sympathetic in the abdomen. In such cases there was sometimes a sudden arrest of the heart's action, in other cases only a temporary diminution in the beating of the heart, while in still other cases there was hardly any effect produced. In those animals in which the effect on the heart was produced, I waited till recovery was established. I then divided the par vagum, after which I crushed again the ganglions; not the least effect was then produced on the heart's action, clearly showing that the transmission takes place through the par vagum. In those cases in which the heart is stopped, whether from the cause above assigned, or any other, such as drinking very cold water when in perspiration, or an emotion, &c.—in those cases of reflex syncope when the patients are on the verge of death, and would almost surely die if nothing were done for their immediate relief—in such conditions there is one means of restoring life, which I have found by experiments on animals to be of the utmost importance, and so much so that very frequently, even when the action of the heart was quite stopped, I

have been able by simply pressing on the sternum, and by giving a hard push to the heart, to make it beat again; and after repetition of the same means, to make it resume its action. It will not beat long if the cause of the syncope is a powerful one, but still it will beat; and if you continue the use of the means mentioned, it will continue to beat, and in that way you may succeed in reviving a patient. But this is not all. If you add to that cause of revival another, which is most powerful, and which is directly the reverse of what John Hunter tried upon himself when he found he was in a state of syncope one day at the College of Surgeons—if, instead of making the patient breathe as quickly as he can, you stop his breathing altogether, just as if you were trying to kill him by suffocation, you revive him. By producing a state of asphyxia for about half a minute, the patient may be saved; he will have a struggle, and come out of it very quickly. Nothing, indeed, is more powerful to make the heart beat than an accumulation of carbonic acid in the blood. Whether I have been right or wrong in maintaining, as I have done, that the normal and abnormal beatings of the heart, when very tumultuous, depend chiefly upon an irritation by the carbonic acid of the blood—whether I am right in this respect or not—there is no question that if you produce temporary suffocation in these cases, you make the heart beat again, and beat with force. I should add that I have not the merit of having discovered this fact, as I find that in an old book, entitled the *Surgeon's Mate*, and published more than 200 years ago, a writer of the name of Woodall has mentioned it as very important. He, however, does not say on what he grounded his view. There are some other features about syncope of great importance. In any case where the circulation is impeded, you may in a moment throw one or even two pounds of blood into the trunk and head, by simply pressing hard on the four main arteries of the body. If you press those four main arteries, you prevent the circulation going on in them, and at once a considerable quantity of blood returns from the venous system to the trunk, especially if the limbs are kept up so as to allow gravitation to help the movement of the blood.

“A few words now upon asphyxia. There are experiments which show, as clearly as possible, that if you take two animals, one of them having had the temperature of its body very much diminished, the other at a normal temperature, and if you dip them both into water at the same time, the one which has had its temperature reduced will survive twice, three times, and sometimes even five times as long as the other—the duration of life under water being sometimes extended to twelve or fifteen minutes. The greater the previous lowering of temperature, the longer the duration of life. There is another very interesting fact. It is well known that persons who have fallen into water have, in many cases, been drawn out and revived after an immersion of a number of minutes. Now, in experiments performed upon animals by applying galvanism to the par vagum so as to stop the heart's action—which is an effect that a fall into water will sometimes produce, by a reflex action from the influence of cold on the skin, or by an emotion—we find life will last much longer; in other words, the animal will be able to survive a much longer time when dipped under water, from having had an attack of syncope just before. This case, then, is exactly the reverse of the former. In one, syncope is cured by asphyxia; in the other, asphyxia is rendered less mortal because syncope previously existed. I need not stop to show that all these notions we owe to physiological science.

“I shall now say a word upon poisoning. Poisoning often produces death by causing such a diminution of temperature as is incompatible with life. Take, for example, two animals which have been poisoned with opium. Supposing the temperature to be cold in the room, lay one of them near a fire and covered carefully with warm clothes, and let the other be exposed to the cold in a corner far from the fire. You will find, *cæteris paribus*, that the one which is kept warm will survive, while the other will die. This fact we find with almost every organic poison, viz., that there is a considerable diminution of temperature produced—if not, *per se*, sufficient to occasion death, enough, at any rate, to add a powerful cause to the other causes existing. Now this diminution of temperature is a feature which we can fight against; and it is, therefore, of the utmost importance, in cases of poisoning, to use every means to keep up the temperature of the body.”

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Physiological Action of Carbonic Acid.*—M. DEMARQUAY, believing that, amidst the contradictory statements which have been published concerning the physiological action of carbonic acid, further inquiry was desirable, instituted numerous experiments upon animals and upon himself, as well as upon several of his pupils, his object being more especially to ascertain the amount of the gas which may be contained in an artificial atmosphere without this becoming irrespirable and poisonous, and to examine the degree of anæsthesia which may be obtained by its agency. The following are the conclusions of the memoir which he has just presented to the Académie des Sciences: 1. Carbonic acid exerts a stimulant action upon the surface of the body, which is marked in proportion as the skin is more delicate and endowed with greater sensibility. The regions of the penis and perineum are more especially sensitive. 2. Analgesia, “when it can be obtained,” is only produced by means of a continuous jet of the gas playing upon a very limited portion of the body. 3. Its action on the senses is of the same character as that exerted upon the external integument, inducing, consequently, vivid excitement, sensorial exaltation, or nervous perturbation, phenomena which are generally only fugacious. 4. It exerts a stimulant action on the alimentary canal, which is accompanied by a slight nervo-vascular irritation. 5. When injected into the veins it is absorbed in large quantities, and eliminated with rapidity, when the operation is conducted with proper precautions; or it may act mechanically by producing considerable distension of the cavities of the heart, and consequent death. 6. Introduced into the economy by the respiratory passages, carbonic acid does not give rise to those toxical accidents which have been so often attributed to it. In fact, in the dose of one-fifth, or even one-fourth to four-fifths or three-fourths of atmospheric air or oxygen, mammalia can breathe it for a long period without seeming to be seriously incommoded. In man, some disturbance, and that of a slight character, is produced only at the end of a period, which varies according to the amount of individual susceptibility, but which is generally sufficiently prolonged to admit of the production of a therapeutical agency, if the employment of the gas were indicated. The lesions found after death, whether in man or animals, do not resemble those which are caused by a toxical agent with which carbonic acid has been often confounded, viz., oxide of carbon. 7. Most of the accidents produced by the vapour of carbon, confined air, the fumes of fermentation vats, wrongly attributed to carbonic acid, should in great part be imputed to carbonic oxide, sulphuretted hydrogen, alcoholic vapours, or other little known gases which originate under such circumstances. 8. Carbonic acid is simply irrespirable, and although it is not so in the same manner as azote or hydrogen, it is not for that reason more hurtful than these gases. Respiration

essentially consisting in an interchange of gas between the blood and the air, and such interchange not being possible, as proved by the laws of physics, except between gases of different natures, it is obvious that carbonic acid when respired in the pure state presents a material obstacle to the pulmonary function, and consequently induces asphyxia. Azote and hydrogen, although unsuitable for playing the part of a vital agent in hæmatisation, and, in fact, irrespirable, are so in a less degree than carbonic acid, because different in their nature from the gas to be eliminated, the interchange can be effected during some instants. 9. The very positive phenomena of anæsthesia obtainable by the agency of this gas in many animals do not seem to be producible in man without danger of asphyxia. Moreover, supposing that anæsthesia thus produced was sufficiently complete, it would still be too fugacious to be of utility for surgical operations.—*Med. Times and Gaz.*, Aug. 19, 1865.

2. *The Marrow of Bones in the Healthy and Morbid States.*—In the *Gazette Médicale* of the present year, M. CHARLES ROBIN, who has for many years made the medulla of bones the subject of histological investigation, has published the result of his researches. We give an abridged translation.

1. *General Remarks on the Constitution of Marrow.*—The medullary tissue of bones is composed of: 1, medullary cells, which are the fundamental element; 2, certain accessory elements called *myeloplaxes*;¹ 3, a certain quantity of amorphous, homogeneous, semi-transparent substance, which is a second accessory element; 4, capillary vessels; 5, the nerves which accompany the vessels; 6, in certain parts only, fibres of laminar tissue and adipose vessels are found. The presence of these is not constant, and they are not found in all portions of the tissue.

Marrow is found in all the bones of the body; and it extends through the vascular canals as far as the periosteum; so that, on tearing away one of the vessels from a vascular canal, it is seen to be surrounded by a small quantity of marrow, represented by medullary cells, a little amorphous matter, and nearly always some myeloplaxes.

This tissue is also found in the vascular canals of the cartilages of ossification; and has been called the marrow of cartilage. Medullary tissue is even found in the ribs in aged subjects, in whom these organs are hollowed into cavities.

Marrow is remarkably soft, doughy, and in some parts nearly semifluid. But this tissue is not a liquid nor a serosity, as has often been written; its consistence varies a little in different subjects, at different ages, and in different parts of the skeleton.

The colour of this tissue varies notably; and hence three varieties of marrow may be distinguished.

The first variety bears the name of *vascular* or *red marrow*, because it is of a strongly-marked red colour; it is also called *fœtal marrow*, because it is the only marrow which is met with in the bones of the fœtus.

A second variety of marrow is the *gelatiniform*. In this variety the marrow, in the long bones as well as the short, presents a peculiar semi-transparency, with a gray or yellow colour, and gelatinous consistence. In some animals, it preserves during life the gelatiniform disposition, which is only temporary in man. It is found accidentally, in certain pathological or senile conditions, in some bones, following morbid alterations of the periosteum.

The third variety of marrow is that which is almost exclusively described under the names of *marrow* (properly so-called) or *fatty marrow*. It is opaque, yellow, and has sometimes been compared to adipose tissue. But it differs notably in texture, in consistence, and in delicacy.

¹ *Myeloplaxes* are defined by M. Robin as consisting of large patches or flattened lamellæ, sometimes polygonal, sometimes irregularly spherical. They are finely granular, and contain in their thickness from six to ten ovoid nuclei, each of which contains one or two nucleoli and molecular granules. The lamellæ have a diameter of from 1-50th to 3-100ths of an inch; and the nuclei are about 1-3000th of an inch long by 1-5000th of an inch broad.

Marrow is one of the tissues, and is composed of elements which have the configuration of cells, with a certain quantity of amorphous matter interposed, varying in proportion according to the varieties of marrow. Capillary vessels are present, arranged in meshes having nearly three or four times the diameter of the capillary vessels themselves. The meshes are nearly of equal dimension in all directions; and are polygonal, with rounded angles. They are most readily seen in injected specimens, by washing away the marrow by a current of water, when they are found lying against the bony tissue. This has caused it to be said that the meshes are much more numerous in contact with the bone than elsewhere. The most delicate capillaries found in the marrow are larger than the ultimate capillaries of the periosteum and of the bony tissue. In the spongy tissue especially, and even where they lie against the bone, they are not distinctly cylindrical like those of the periosteum, and resemble sinuses moulded on the neighbouring parts.

In the medullary tissue are certain accessory elements called myeloplaxes. They are always found on the surface of the marrow; that is to say, in some degree, between the marrow and the bony tissue. They are more abundant in the spongy tissue than in the medullary canal of the long bones; they are also more abundant in the foetal marrow, and in young subjects than in adults. In the adult, they are mostly found in the spongy tissue, and especially in the neighbourhood of the cartilages which adhere to the bone. Their relatively greater abundance in the bones of young subjects depends either on the fact that their quantity diminishes in adults, or rather that the myeloplaxes have not multiplied proportionally to the other elements. Myeloplaxes are met with in the marrow which accompany the vessels in the vascular canals as far as under the periosteum; so that, when the periosteum is torn away, and the vessels entering the vascular canals are removed, myeloplaxes are also drawn away.

Another accessory element consists of fibres of laminar tissue found in certain portions of the marrow. There is, however, no internal periosteum; no layer of fibrous tissue on the interior of the bones, enveloping the marrow, and designed to separate the bony substance from the marrow. The marrow is in immediate contact with the bony substance. For a long time it was believed that this membrane existed only in the canals of the long bones, and was wanting in the spongy tissue. But, in the gelatiniform variety of the marrow, in the amorphous substance which takes a notable part in the constitution of this variety, there is a network of fine laminar fibres crossed in all directions, and in close contact sometimes with the vessels and the trabeculae of the bone. It is only in the shafts of the long bones, and in the largest medullary spaces of the spongy tissue, that this fibrillary network is found. It is wanting in the marrow which fills the smaller cavities of the spongy tissue of the extremities of the bones, of the vertebrae, sternum, etc.

In this network, the fibres are generally isolated, crossed or not. Around the bony trabeculae which traverse certain points of the medullary canal of the long bones, these fibres lie closer to each other than elsewhere, without, however, forming layers or bundles.

Here and there, in the marrow itself, these fibres are disposed in wavy bundles, slightly pressed against each other. From these bundles radiate, in a varied and very elegant arrangement, isolated fine wavy fibres, sometimes crossed; and between them lie the medullary cells, the amorphous matter (which may exist alone), capillaries, and adipose vesicles. These peculiarities of texture are developed about the middle or the end of the second year. Before this, only a few completely developed laminar fibres are found; they are yet in the state of fibro-plastic bodies, both fusiform and stellate, free or lying together in an order which it is then difficult to determine. Among the fibres, whether isolated or arranged in loose bundles, there always remains some of the fusiform or stellate fibro-plastic bodies; and in some parts, these are the centres of fibrils which radiate from their periphery. In the fatty, or partly fatty, marrow, fibro-plastic bodies are found, which have already passed into the state of adipose vesicles, and are either filled with oil or contain only a few drops. It is by the transformation of these fibro-plastic bodies into adipose vesicles that the marrow assumes the adipose state. While this transition is taking place, or in marrow

which retains the gelatiniform state. fibro-plastic bodies are often seen which have passed into the state of adipose vesicles, and at the same time serve as centres of radiation to two or more laminar fibres; or they seem as if jointed to some fibres of the fibrillary network. In the transparent marrow of emaciated subjects, these facts are equally well seen; but the vesicles contain towards their centre only one or two large drops of oil of a deep yellow colour, strongly refracting the light, together with smaller ones, of the same or a paler tint, surrounding them.

II. *Varieties of Colour and Texture presented by Marrow.*—Let us now see what are the peculiarities of texture which give, in certain cases, a red aspect to the marrow; while, in others, it presents a gelatiniform appearance; and again, in other circumstances, it assumes the adipose state, which has nearly always been as the type of description of marrow.

The foetal, or red marrow, owes its colour to being composed chiefly of medullary cells, with some vessels and a small quantity of amorphous matter. The medullary cells, which seem to form with the vessels about eight-tenths of the whole of the tissue, do not appear to contain any drops of fat in their interior. The marrow thus constituted is gradually, in the course of its development, replaced by a semi-transparent, gray, gelatiniform tissue. This change of colour, this passage of the first variety to the second, is owing to the fact, that the amorphous substance interposed between the medullary cells increases, in certain conditions, more than the cells themselves; so that the medullary cells in gelatiniform marrow are separated one from another by a large quantity of semi-transparent homogeneous substance, having a gelatiniform aspect.

This gelatiniform marrow is sometimes gray; sometimes it has a nearly semi-transparent yellow colour. Its gray colour depends on the absence of adipose cells between the other elements; and the yellowish appearance depends on the separation of the medullary cells and the presence of adipose vesicles.

It has already been seen that it is by the transformation into adipose vesicles of the fusiform or stellate fibro-plastic elements of the laminar fibres that the fatty marrow is formed. Here the amorphous matter disappears, and the fibres of the network, as well as the medullary cells, are compressed between the adipose vesicles. But when the marrow passes into the gelatiniform state in consequence of emaciation, or when it returns to the red state in consequence of inflammation, or of the presence of a tumour on the bone or in the medullary canal, the amorphous matter reappears, and the medullary cells again become visible in even greater number than before.

There is a great difference between marrow rich in fatty vesicles, and adipose tissue. In the marrow, the cells are simply placed in juxtaposition; the medullary cells being interposed, and the amorphous matter remaining in some parts. The adipose cells are not disposed here in lobules, separated one from another by partitions formed by laminar fibres, as in the adipose tissue. Farther, the size and the form of the capillary meshes are different. Hence, the medullary tissue is more soft; the fatty vesicles are more easily ruptured than in adipose tissue.

The passage of marrow into the adipose state takes place more in certain bones than in others. Very frequently, the long bones are filled with yellow or adipose marrow; while the bodies of the vertebræ, the sacrum, and the sternum, still contain the red variety. The flat bones sometimes contain reddish marrow in their diploe, while the long bones are filled with yellow fatty marrow. Fatty marrow is relatively less vascular than gelatiniform marrow or yellow marrow. These differences of the marrow of one bone from another in the same subject deserve careful study.

The red, gelatiniform, and fatty varieties of marrow are found, with analogous peculiarities of texture, in most mammalia, varying with the species as well as with the age in the same species. Amongst ruminants, especially those which are fattened, the marrow passes at an early period into the adipose state. In the hog, it remains much longer of a reddish-gray colour, poor in adipose vesicles, and, on the contrary, richer, at least relatively, in medullary cells and amorphous matter.

In the dog, as soon as the animal has attained about its full size, the marrow

in the canals of the long bones is of a yellowish-red colour, and a soft and pulpy consistence. It is then about one-half or two-thirds composed of medullary cells, with free nuclei and complete cells in nearly equal proportions. These elements are contiguous, or are separated one from another by a small quantity of amorphous matter. Here and there, large adipose cells, breaking down under the least pressure, are found either separate or collected into small masses of two, three, or more, thus giving a yellowish colour to the tissue. In the extremities of these bones, and in the short and flat bones, the marrow is red, and contains no adipose vesicles, or only very few. Small myeloplaxes, possessing two or three nuclei only, are still seen.

The marrow possesses only the vegetative properties—nutrition, development, and reproduction. But the nerves which accompany its nutritive vessels are sensible to pricking and tearing, as Duverney pointed out.

The marrow is formed after the bony tissue; the latter is compact at first, even in long bones; and it is only when the central parts of the bone are absorbed, that cavities are formed which become filled with marrow. Hence, it is impossible to admit that the medullary tissue arises from embryonic cells, as some authors suppose, who would directly connect the generation of all anatomical elements with the cells proceeding from the segmentation of the yolk.

III. *Morbid Modifications of Marrow.*—The morbid modifications which may be presented by the marrow are sometimes direct; that is to say, the marrow may, without change of volume or quantity, present certain alterations, as in inflammation. When the marrow, which has presented a yellow colour, becomes inflamed, it takes an intense red colour, owing to the multiplication of the medullary cells, and to the disappearance of the fat from the adipose vesicles. In proceeding from the inflamed towards the sound parts, more and more medullary cells are gradually met with; or, *vice versâ*, in a contrary direction, the fat in the adipose vesicles diminishes in proportion as the red parts are approached.

In some conditions, the inflammation becomes so intense that the medullary cells cease to receive materials fit for their continuous molecular renovation. The marrow then softens and becomes liquid, and flows from the extremity of the fractured or amputated bone. When this liquid is examined, there are found in it only molecular granules in suspension, sometimes nucleated medullary cells, and always drops of oil; for the liquefaction melts down the walls of the fatty vesicles, and sets free the oil. This is always a grave fact, as has been demonstrated in the study of fractures, especially those of long bones, and in certain other pathological conditions, as amputations followed by so-called purulent infection.

Very frequently the marrow passes from the fatty state, or the red state found in the short bones and in the fœtus, to the gelatiniform state, in consequence of the presence of a tumour in the neighbourhood of the bone. When an ulcer exists on the anterior aspect of the tibia, or when a tumour is adherent to the bone, the marrow at this level very frequently presents a gelatiniform aspect, although preserving the fatty state in the rest of the bone. Commonly, also, in cases of white swelling the marrow is gelatiniform in a part of the bone. In these circumstances, amorphous matter is produced in a considerable quantity in that marrow which has assumed the gelatiniform state; and it is this which gives to the tissue its peculiar semi-transparency. Sometimes, but especially in white swellings, small yellowish masses in the centre become gelatiniform, because the change does not take place equally through the whole extent of the marrow. These small fatty masses give a peculiar aspect to the diseased part. It has often been believed that these small yellowish masses are new productions; but they are simply small masses of cells in which the fat is not absorbed.

The name of myeloid tumours has been generally applied to tumours originating in the marrow. This expression may be accepted; but it is bad in this sense—that these tumours have no analogy in exterior aspect or in texture with the marrow of bones.

Some tumours are due to an excessive production of medullary cells or fundamental elements of the medullary tissue. These tumours are the most rare;

and they nearly always contain many more free nuclei than completely formed medullary cells. These tumours are more frequently met in the spongy portions of the bones and in the flat bones, than in the shafts of the long bones. The cells and nuclei, multiplying without measure, form a more or less considerable mass which always presents a reddish-gray colour, and is remarkably friable. This is due to the fact, that the medullary cells and nuclei are accompanied by a much smaller quantity of vessels and of interposed amorphous matter, than exist in normal marrow. When these tumours increase in size, they frequently assume an encephaloid appearance. This encephaloid aspect, however, does not indicate the character of the tumour; for several kinds of tumours may, at various periods of their evolution, present a grayish or whitish colour, and a softness comparable to that of the substance of the encephalon. This state is generally owing to the production of fatty granules, either in the constituent elements or between them. In the particular case of tumours formed by medullary cells, the encephaloid aspect results from the production of granules, mostly fatty, principally interposed between the medullary cells, a few only being formed within them. In these tumours, adipose vesicles are not produced, notwithstanding the presence of a certain amount of fibro-plastic laminar fibres, as in healthy marrow. This interposed fat is not yellowish fat, like that which exists in normal marrow; it is a fat which reflects a white light, and has a very powerful refractive power. These tumours may encroach upon the bones and neighbouring tissues, producing atrophy in them. They are very commonly produced in the thickness of long bones or of the spongy tissue, and, after producing absorption of the bone, encroach upon the neighbouring parts.

The second species of tumour which is developed at the expense of the medullary tissue, comprises the tumours resulting from the excessive production of myeloplaxes, accessory elements of the marrow. These tumours may be produced everywhere where there are myeloplaxes; for the myeloplaxes accompany the vessels as far as the periosteum. These are the most common tumours which are derived from the medullary tissue. Their tissue has no exterior analogy with that of the healthy marrow; it resembles muscular tissue in colour and consistence.

These tumours may attain very variable dimensions in different parts. Their consistence varies according to the periods of their evolution. Not unfrequently they undergo softening after having attained a large size; and this softening nearly always coincides with certain modifications of texture. The myeloplaxes forming the fundamental element of these tumours are mixed generally with laminar fibres, either completely developed or in the state of fusiform bodies; but medullary cells are scarcely ever found.

When these tumours acquire a certain size, they are seen to consist in some parts exclusively of myeloplaxes; while, in others, fatty granules are deposited here and there, so that some portions of the tumour have a yellowish or orange-yellow tint, while others preserve the ordinary red colour; producing a remarkable marbled aspect. At the same time, fatty granules are deposited between the myeloplaxes. Then, in all these parts, the tissue loses its consistence, which has been compared to that of muscular tissue, and which has obtained the name of osteosarcoma for it. It is very common in these cases to see softening of the morbid product; and the name of encephaloid tumour has been given to it, because there is some resemblance in consistence and colour to the encephalon. It is but moderately vascular—much less so than many other morbid products.

These tumours are generally developed in the spongy tissue, rather than in the shafts of the long bones. Wherever these tumours are developed, the vessels, arterial as well as venous, become enlarged; so that pulsation may often be perceived, whence the name of aneurismal tumours, or aneurism of bone, has sometimes been given to them. The vessels, however, which produce the pulsations, are situated on the surface of the tumours, or in the partitions which divide them into several lobules. They always arise in the network itself formed by the myeloplaxes, in which the capillary vessels are relatively scanty.

These tumours differ much in texture and in form from those which arise from medullary cells; and they also differ notably from many other tumours

with which they have been confounded under the name of cancer, osteosarcoma, etc. Heterotopic generation of the constituent elements of the marrow has not yet been observed, notwithstanding that heterotopic generation of epithelial, glandular, and other tissues, has been noticed. In certain fibrous tumours, sometimes developed in contact with the periosteum, but sometimes at a distance from it, myeloplaxes may be met with. In the case of heterotopic production of cartilage—that is to say, in vascular enchondromata—marrow analogous to that of the bones may be found. It is the abnormal production of the cartilage which determines this generation of marrow.—*British Med. Journ.*, June 10, 1865.

MATERIA MEDICA AND PHARMACY.

3. *Liebig's Food for Infants and Invalids*.—Dr. ARTHUR H. HASSALL has written (*Lancet*, July 29, 1865) the following interesting letter in regard to this new article of food:—

“In the preparation of this food, the two principal objects at which Liebig aimed were—first, to produce a food which should resemble human milk in the relative proportions of its heat-giving and flesh-forming constituents; and, secondly, to reduce it to the state most easy of digestion and assimilation.

“It should be clearly understood, however, that the formula given by Liebig, although it furnishes an article having about the same relative composition as human milk, is yet of twice its strength, or, to use the words of Liebig himself, it contains ‘the double concentration of woman’s milk;’ and therefore there is reason to believe that in some cases this food will prove too rich for the infant’s stomach, and will require dilution.

“It appears to me that the great merit of Liebig’s preparation consists in the use of malt flour as a constituent of the food: this, from the diastase contained in it, exercises, when the fluid food or soup is properly prepared, a most remarkable influence upon the starch, quickly transforming it into dextrin and sugar, so that, in the course of a few minutes, the food, from being thick and sugarless, becomes comparatively thin and very sweet. That the action of the diastase on the starch is very considerable is amply proved by the following analysis:—

<i>Uncooked Food.</i>	
Albuminous matter	9.25 grains per cent. ¹
<i>Dried Cooked Food.</i>	
Albuminous matter	15.84 grains per cent. ²
Fatty matter	8.49 “
Sugar of glucose	37.73 “
Sugar of milk	10.90 “
Dextrin and starch	27.04 “
Total	100.00

“It will be observed, by an examination of the above figures, that a very large proportion of the starch has become converted, in the course of the preparation of the food, into sugar.

“Correct and ingenious as are the principles upon which this food has been designed, yet the directions given for its preparation are certainly open to considerable improvement. Thus Liebig directs that the malt should be ground in a common coffee-mill and the coarse powder passed through a sieve. This necessitates the subsequent straining of the food—a tedious operation—in order to remove the bran and remaining particles of husk. And further, that the food should be put upon a ‘gentle fire’ previous to its being finally boiled. Now, a gentle heat may mean almost any temperature nearly up to the boiling point; and,

¹ Containing 1.43 grains of nitrogen.

² Containing 4.45 grains of nitrogen.

since the action of the diastase is destroyed at about 150° F., the temperature ought never to be allowed to exceed that degree.

"I recommend, therefore, that the malt should be well freed from husk and finely ground; that the wheat flour should be lightly baked; and, finally, that a thermometer should be employed in the preparation of the food. Indeed, in some samples recently submitted to me by Messrs. Savory and Moore, I find that the first two points noticed have been attended to, and that they use malt freed from husk and finely ground, and the wheat flour baked.

"The effect of baking the wheat flour is to partially cook the starch entering into its composition, so that less heat is required in the preparation of the liquid food. I find that a temperature ranging between 140° and 148° is amply sufficient to effect the complete transformation and solution of the starch-corpuscles, and, indeed, to cook the food sufficiently."

4. *Therapeutical Value of Arnica Montana.*—Although the *arnica montana* has long been empirically employed, no accurate inquiries appear to have been made as to its real uses in medicine. It is said to act as a powerful irritant, exciting sneezing when applied to the nose, and producing emetic and purgative effects if given in large quantities. The composition of the plant has been shown to be the ordinary vegetable principles, a little volatile oil, a bitter matter, and an acrid resin. It has long been used as an external application, but Dr. GARROD has tested its powers in an experimental manner without any satisfactory results. He chose some patients who had been subjected to the operation of dry-cupping, by which, of course, ecchymoses, or bruises, were produced; and as the cupping glasses were applied symmetrically to the two sides of the body, it was easy to compare the results. In some of the experiments, bruises were made on each side of the sternum, and arnica lotion was applied on one side, and spirit and water on the other; the results were altogether negative, and were indeed almost exactly the same as when no treatment was employed. In other experiments it was found that although there was no perceptible difference between the results of cases treated with tincture of arnica and with rectified spirit, yet that there was a decided improvement in the treatment by either of these alcoholic preparations as compared with the cases left to themselves. Dr. Garrod is led to conclude that the application of spirit to a bruise is decidedly beneficial, and that therefore the popular use of brandy or other spirit and water in such cases is justified; but that the addition of arnica to the spirit is unattended with appreciable good effects. Of the internal use of arnica Dr. Garrod has very little experience, and in cases where he has employed it the results were by no means definite.—*Med. Times and Gaz.*, January 30, 1854.

5. *The Chemical Composition and Physiological Properties of the Scilla Maritima.*—In a long and elaborate paper on the *scilla maritima*, published in the "*Weiner Wochenblatt*," Dr. C. D. SCHROFF proposes a series of questions in reference to the medical characters of that plant. He first discusses the question whether the squill-bulbs of commerce are derived from one or two species, and he comes to the conclusion that although a red and a white bulb of the squill are known, yet that they belong to the same species, and that the colour depends upon the nature of the soil and the place of growth.

In reference to the physiological action of squill, the experiments of Dr. Schroff confirm the opinion hitherto entertained, that this plant stands in a peculiar relation to the respiratory and urinary organs. In the animals employed for the experiments, the kidneys were congested with blood, and the urine was very much increased in quantity and mixed with blood. The more the acrid principle contained in squill prevailed in quantity in the preparations used, the more violent was the action on the lungs; while the *scillitin*, which had but little taste, occasioned more of the phenomena of narcotism. Squill ought therefore to be placed among the narcotico-acrids, near Hellebore and Colchicum. From aconite it is particularly distinguished, from the circumstance that it acts immediately on the kidneys and produces an increased determination of blood to those organs; while aconite, like digitalis, acts first of all by its effects on the

cardiac movements by a change of the force of the circulation. Colchicum and squill, on the other hand, agree with one another in these respects, that their principal action is directed to the ganglionic system, and by its means to the organs of secretion and excretion; and that they both possess an acrid principle, together with their active bitter principles, *colchicin* and *scillitin*, and in addition to their narcotic property. Squill acts, however—and especially by its acrid principle—much more immediately on the kidneys than colchicum. The narcotic property of both plants is only of subordinate therapeutical value, and is chiefly important when the object is to act upon the ganglionic system, and to increase the process of excretion, as in rheumatism and gout. In this respect colchicum is to be preferred, but squill ought to be resorted to when, in especially suitable conditions, a powerful expectorant and diuretic is required. Compared with cantharides, squill appears a much milder diuretic; and, in order to develop hyperæmia of the kidneys, much larger doses of the latter are required than of cantharides.—*Brit. and For. Med.-Chir. Rev.*, July, 1865, from *Schmidt's Jahrbücher*, April, 1865.

6. *Oxygenated Saline Waters*.—Dr. B. W. RICHARDSON laid before the British Medical Association at its recent meeting, specimens of oxygenated saline waters. In these solutions he had succeeded in combining peroxide of hydrogen (containing ten volumes of active oxygen) with various saline substances, and especially with salts of iron. The waters, when properly diluted, were almost tasteless, the taste being so unobjectionable that children could take them, and adults could drink them at meals in place of common water or other fluid. The solutions presented were a diuretic water carrying nitrate of potassa and spirit of nitric ether; a simple aperient water conveying sulphate of potassa, and two chalybeate saline waters, one containing phosphate, the other persulphate of iron, with a little free oxide of iron. The waters were all mildly aperient. They were used for adults in proportions of two ounces for a dose, ordinary water being added so as to fill a tumbler. Specimens were diluted in this way and handed to the members. Dr. Richardson said that the water containing the persulphate of iron was the best chalybeate aperient he had ever used. It remained fresh for weeks, and its appearance resembled to perfection a natural mineral chalybeate water. It differed, however, from such water in that it contained a little sugar and was rich in oxygen. Each dose contained a grain of the iron salt. The formula for this water was as follows:—

Peroxide of hydrogen	. . . . .	3j.
(ten volumes of oxygen)		
Sulphate of potassa	. . . . .	3j.
Chloride of sodium	. . . . .	3iss.
Sulphate of iron	. . . . .	gr. xij.
Simple syrup	. . . . .	3j.
Water to	. . . . .	3xxiv.

Dose: Two fluidounces to be taken with as much water as will fill a tumbler.

In obstinate cases of constipation with anæmia, and in cases of asthenic gout, this solution was most useful. The advantages derived from the peroxide of hydrogen in these waters were most important, the peroxide quickening the eliminative action, and producing free secretion and excretion.

In reply to a question as to the manufacture of these waters, Dr. Richardson said that any practitioner who had the peroxide of hydrogen could make the waters for themselves, but they were very efficiently made by Messrs. Garden and Robbins, of Oxford Street, London.—*Medical Times and Gaz.*, August 19, 1865.

7. *New Anæsthetics*.—THOS. NUNNELEY, Esq., of Leeds, showed to the members, at the late meeting of the British Medical Association, two substances, the bromide of ethyl and the chloride of olefant gas, which for some time past he had used as anæsthetics. He stated that he had not lately performed any serious operation, either in private practice or at the Leeds General

Infirmary, without the patient being rendered insensible by one or other of these agents; each of which he believed to possess important advantages over chloroform. They were amongst the many analogous bodies experimented upon by him; and were favourably mentioned in his essay upon *Anæsthesia* which was published in the *Transactions* of the Association for 1849. At that time, the difficulty and cost of their manufacture were too great to allow of their being commonly used. This difficulty had, however, been overcome; and, should their use become general, they can be made at a cost not exceeding that of chloroform, if not at less. They both act speedily, pleasantly, and well. The patient might be kept insensible for any length of time, while the most painful and prolonged operations were being performed. No disagreeable symptoms had, in any case, resulted from their use. They were prepared for Mr. Nunneley by Mr. Squire, of Oxford Street, London, from whom they might be obtained.—*Ibid.*

8. *Forms of Galvanic Current required for Therapeutical Purposes.*—These, according to Dr. J. ALTHAUS, are only two, viz: “the induced or interrupted electro-magnetic, and the continuous galvanic current, the methodical employment of which has been termed respectively ‘Faradization’ and ‘Galvanization.’” Ordinary frictional electricity possesses no peculiar advantages of its own, and has, therefore, been almost entirely abandoned here as well as on the Continent; while the magneto-electric current, which is still much used at the present time, and which, in its physiological effects, is analogous to the electro-magnetic current, yet proves to be decidedly inferior to the latter, and is therefore not required in the electro-medical instrumentarium, which should, for various reasons, be as simple as is consistent with efficiency.

“The double-current induction machine, and the modification of Daniell’s battery, both constructed according to my directions by Mr. Becker, of the firm of Messrs. Elliott Brothers, of St. Martin’s-lane and the Strand, are sufficient for all practical purposes. The former of these apparatuses is similar to the induction machines which are now in general use on the continent; whilst the constant battery just mentioned is, for beauty and efficiency of arrangement, superior to any that have hitherto been contrived. In those constant batteries which have until now been used by medical men, the great drawback has been the presence either of nitric, sulphuric, or chromic acids, which not only after a time destroy the battery, but also entail considerable variations in the power of the current, and much loss of time on the part of the operator. It was therefore desirable, in the construction of a battery suited for medical practice, to dispense with acids altogether, in order to render the current as constant as possible, and to avoid inconvenience and loss of time. For these reasons the machine mentioned is only charged with water and a solution of sulphate of copper, with the result that after having been once put into action a constant current is obtained, which continues reliable for about six months, even if the battery is daily used. No acid being present, the cast zinc cannot be destroyed, and remains quite unchanged. After the lapse of the period mentioned, the deposit of copper must be removed from the zinc plates, and a fresh solution of sulphate of copper be substituted. If this be occasionally repeated, the battery will last for any length of time; while most constant batteries, when daily used, are destroyed in about a twelvemonth, and some even in so short a space as six weeks. Another advantage of the absence of acid in this battery is, that the current gains in quantity while it loses in tension, and can on this account be safely used for acting on the centres of the nervous system.

“The physical relations and the chemical and physiological effects of the continuous and the interrupted current are widely different from one another; and it may therefore be inferred that each one of them has also its own special sphere of action in therapeutics. The continuous current, which is produced by the chemical action of two heterogeneous conducting bodies, moves always in the same direction, and has considerable chemical effects; as it easily decomposes water and saline solutions, oxygen and acids being attracted to the positive pole, while hydrogen and alkalies accumulate at the negative pole. Induction currents, on the contrary, are of instantaneous duration, move alternately in contrary directions, and have therefore only a slight chemical action; for,

as each wire serves alternately as positive and negative pole, their chemical effects are, in a great measure, neutralized as soon as produced. As regards the difference in the physiological action of the two currents, it may be laid down as a fundamental principle, that *the induced current only acts on the parts directly submitted to its influence, unless a very high power be used; while the continuous current, by reflex action, also affects distant parts, and more especially the centres of the nervous system.* As this is a new proposition, it will be necessary to adduce proofs in order to establish its correctness.

"If the induced current is, by moistened conductors, applied to the face, it causes a peculiar sensation and contraction of the muscles; while the continuous current, if applied in the same manner, not only causes a peculiar sensation, and a contraction of the muscles both at its commencement and at its cessation, but also a vivid flash of light; and if the current be one of some force, even sickness, giddiness, and fainting may ensue. These latter phenomena, which are caused at whatever part of the face or nape of the neck the current may have been applied, can only be explained by assuming the physiological transmission of part of the current to the encephalon. There are also facts to prove that the continuous current has a physiological action on the spinal cord and the sympathetic nerve, if applied to the skin of the back by moistened conductors. Thus we may often cause the iris to contract by directing a current of large quantity to the lower cervical and upper dorsal vertebræ, showing that there is physiological transmission of part of the current to the cilio-spinal region of the cord and the corresponding ganglia of the sympathetic, which preside over the functions of the iris. Again, by applying a continuous current to the lumbar portion of the spine, we may cause a glow in the legs and feet, without any direct application to these latter, showing that the influence on animal temperature, which M. Claude Bernard and Dr. Brown-Séquard have proved to belong to the sympathetic, is brought into play by the application of the continuous current. These facts would appear sufficient to establish the correctness of the proposition with which I started—viz., that the continuous current is capable of influencing, by reflex action, the centres of the nervous system, both cerebro-spinal and sympathetic; while the induced or interrupted current has no distant, but only local and immediate effects.

"The therapeutical experience I have gained in various forms of paralysis with both kinds of current, entirely coincides with these physiological premises. It is to the effect that the interrupted current proves useful in local paralysis, due to injury of the motor nerves and muscles, to pressure, rheumatic effusions, poisoning by lead, &c., but can have a beneficial influence in paralysis from diseases of the nervous centres only after the original lesion has subsided, and in reflex paralysis only after the irritation in the spinal cord has passed off. The continuous current, on the other hand, proves efficient in certain forms of paralysis due to affections of the nervous centres, more especially in those cases which are caused by effusion in the spinal canal and incipient softening of the cord, as well as in most instances of reflex paralysis where irritation of the cord is still present."—*Lancet*, Aug. 12, 1865.

9. *Ointment of Yellow Amorphous Oxide of Mercury.*—This article, highly recommended by Dr. PAGENSTECHER in conjunctivitis and phlyctenular corneitis, is best prepared according to Dr. HOFFMAN, as follows:—

"Care must be taken in the precipitation to obtain a pure oxide, and not any of its compounds, to which precipitates of mercury have a great tendency—a fact which might detract from the efficacy of the preparation. The precipitation is effected by adding a solution of the chloride of mercury to a solution of potash, in such a way that there is always an excess of the latter. After the precipitate has deposited itself, the supernatant fluid is at once poured off, the precipitate thoroughly washed with distilled water, and dried by a gentle heat, with exclusion of daylight. Thus prepared, the yellow precipitate has a light-yellow (that of the yolk of an egg) colour, and is an exceedingly fine powder, which, even under the microscope, appears completely amorphous. In addition to both the above-signalized properties, it differs from the ordinary precipitate in

its chemical behaviour, being much more quickly acted on by reagents. A solution of oxalic acid, which acts on the red oxide only after boiling, very quickly changes the yellow oxide, even at the ordinary temperature, into the white oxalate. The preparation of hypochloric acid gas depends on the property the yellow oxide of mercury possesses of decomposing in contact with chlorine gas; the results being hypochloric acid and chloride of mercury; whereas the red oxide undergoes, with chlorine gas at the ordinary temperature, hardly any change. This difference of chemical behaviour of the two oxides constitutes a different degree of resistance to the various agents they are submitted to, and is explained by their different states of cohesion. In respect to the use of the yellow precipitate for eye-ointments, I may be allowed to say a few words on the vehicle of the ointment. The most perfect vehicle for an eye-ointment must be very soft, without, however, being too fluid, lest the heavy oxide sink to the bottom; but when in contact with a moderate heat of the body, it must completely melt, so that the preparation it contains may become quickly and uniformly diffused over the eye. Besides this peculiarity of consistence, the vehicle must be, as far as possible, indifferent in its behaviour to the oxide, and exhibit the least possible tendency to rancidity, which might exert a deoxidizing, reducing action on the oxide. Numerous experiments with hog's-lard, butter, glycerin, glycerin ointment, and mixed fats, have led me to give the preference to the last; and I recommend either the mixture of spermaceti, wax, almond-oil, and rose-water, known as 'cold cream,' only omitting the water, as this favours rancidity, and substituting for it quantities of almond-oil, varying according to the heat of the weather; or a mixture of butter, of cocoa, and almond-oil, likewise proportionate to the temperature. In both compounds the almond-oil must be as fresh as possible, and had best be prepared by the apothecary himself."

Dr. Pagenstecher uses one drachm of this oxide to one ounce of ung. cetacei. If it irritates too much, the strength may be reduced to one-half.

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

10. *Epidemic Cerebro-spinal Meningitis in Germany*.—In the number of this journal for July last, p. 222, we presented a brief abstract of Professor WUNDERLICH's observations. In a subsequent paper (*Archiv der Heilkunde*, 1865, No. III.) the results of the author's maturer experience are published, and are of such interest and importance that we propose to present the substance of them to our readers.

The limited epidemic of cerebro-spinal meningitis in Leipzig, in July, 1864, did not terminate with that month. In August and September a few cases occurred, and then, after an interval of not quite four months, the disease revived. Meanwhile it spread throughout Germany.

The phenomena of cerebro-spinal meningitis and their characteristic grouping are so diverse, that individual cases of the disease are often very dissimilar. Thus, it assumes every degree of gravity, now developing itself with an almost explosive and rapidly fatal suddenness, and now lingering through a tedious chronic course.

Its anatomical characters are, also, by no means uniform. The cerebral and spinal pia mater is, indeed, the part most constantly affected, and especially in the severest cases; but sometimes the lesion occupies the convexity and sometimes the base of the brain, and again the spinal membranes, chiefly; not uncommonly the arachnoid is at the same time involved; perhaps the only lesion in other cases may be one affecting the substance of the brain itself or of the spinal cord; and, finally, the amount and the quality of the exudations are extremely

various. If we consider these diversities in symptoms and in lesions, we are led to ask whether or not all the cases attributed to this disease are really identical in nature; whether they are not different affections possessing only a certain rude analogy with one another in their seat; and whether various morbid processes affecting different portions of the nervous system are not associated under a common name. But a careful study of the disease, with an analysis of its symptoms, proves it to be, *sui generis*, a true pathological entity.

It is particularly worthy of remark that although many phenomena of this affection are explicable by the lesions found in and about the nervous centres, yet many others are present which cannot be referred to those lesions, which, indeed, are not, themselves, uniformly proportioned in extent to the gravity of the symptoms. Hence we must be convinced that cerebro-spinal meningitis is rather a constitutional than a local disease, and one whose symptoms are not to be explained merely by a reference to its anatomical lesions alone. As in infectious diseases generally, there is some morbid power behind the textural change in this affection also. Upon it and its mysterious modifications the various degrees of malignity may depend; for just as in scarlatina, typhus, diphtheria, &c., it is precisely the severest cases which hurry on without remission to a fatal close, and in which the slightest anatomical alterations are discovered, or, indeed, cannot be detected at all.

In the several diseases just referred to, and in cerebro-spinal meningitis also, sometimes the constitutional and sometimes the local phenomena predominate, the latter being palpably effects of the anatomical lesions. It is very remarkable that in that disease these two sets of phenomena present themselves in such variable proportions; so that, on the one hand, cases occur in which it seems as if the life of the body in all its parts perished by a sudden and deadly intoxication, and, on the other, instances in which the attack presents all the characters belonging to a purely local disease, just the same thing occurs in many other, both general and, so-called, local affections, *e. g.*, typhoid enteritis, the hemorrhagic diathesis, articular rheumatism, pneumonia, bronchitis, erysipelas, &c.

The circumstances of its occurrence and extension afford decisive evidence of the infectious nature of the disease, and an analysis of its symptoms is equally conclusive against its purely local anatomical origin. Its characteristic phenomena may be arranged in two groups: 1st. Those which depend upon cerebro-spinal meningitis. 2d. Those which denote a general derangement of the system.

The cerebro-spinal symptoms are these: Pain in the head, spine, and loins; various local hyperæsthesia, and sometimes pains of excruciating intensity of greater or less extent; confusion of the senses; a peculiar fixed or absent expression, delirium, coma; stiffness, rigidity, or contraction of the muscles, especially the cervical, and sometimes a permanent stiffness of the neck, rigidity of the spinal muscles and sometimes opisthotonos, rigidity also of the extremities, or of particular muscles, strabismus; muscular twitching, and more rarely automatic movements or convulsions; occasionally alterations of the pupils; tactile insensibility, deafness, and perhaps amaurosis, impaired muscular power and paralysis of various degrees and extent, most generally confined to the lower limbs, but sometimes affecting the trunk also; difficulty in voiding the urine and feces, or the complete retention of both.

The constitutional symptoms are the following: A chill, initial only, or repeated during the first stage; elevation of the temperature of the body in very various but not irregular degrees; the pulse more or less frequent according to circumstances; thirst, dryness of the tongue, diarrhœa, or constipation, enlargement of the spleen; cutaneous eruptions, most frequently herpes; diminution of the chlorides in the urine, phosphatic sediments, and slight albuminous cloudiness; hemorrhage from various parts; catarrh of the mucous membranes; secondary exudations, especially in the lungs.

Certain symptoms may have a local or a constitutional origin, as palpitation and increased impulse of the heart, nausea and vomiting, a sense of weariness and exhaustion, &c.

A consideration of the particular symptoms does not reveal the nature of this

singular disease. A comparison of the two groups of symptoms above described is of more value, especially for diagnosis. But their proportion to one another varies extremely, according to the intensity of the attack, and the rapidity of its development. Three types or grades of the disease may thus be distinguished.

First, in the gravest and most rapidly fatal cases, the two groups of symptoms appear to be regularly developed to their highest pitch. But sometimes the one and sometimes the other class predominates from the first. The nervous symptoms, particularly, develop themselves with extreme rapidity, yet do not attain so high a degree in these as in the more gradually formed and less fatal attacks. These symptoms sometimes appear to be checked in their progress by the occurrence of a tendency to general exhaustion or to dissolution. Those belonging to both groups are of equal value as regards diagnosis in the very grave and rapid cases; but neither can be regarded as decisive without the presence of the other. The symptoms, also, are less significant by their intensity than by their character.

In the gravest cases the development of the cerebro-spinal phenomena is identical with that which is observed in other severe acute cerebral affections. Intense headache is followed by delirium, and this by fatal coma. Among the symptoms which render the existence of cerebro-spinal meningitis probable are the extension of the pain in the back to the whole spinal column, stiffness or immobility of the spine, and imperfect movements of the iris. Furthermore, the occurrence of disseminated muscular twitchings, the rigid fixation of the head and the impossibility of restoring its position by passive motion, the sensibility of the skin increased in some parts and diminished in others. The associated constitutional phenomena belonging to this high grade of the disease denote it still more clearly. They are: sometimes an initial rigor with chilliness of longer or shorter duration; sometimes an eruption of roseola or herpes; later, enlargement of the spleen, and then fever. Sometimes at the commencement of the attack the temperature is but moderate, but it shortly rises so as to reach the unusual height of 106° to 108° F., and even higher. At the same time the pulse grows very frequent; and these febrile symptoms go on increasing until death. Yet there are cases which reach their fatal termination so rapidly in the midst of grave nervous symptoms, that the organic disturbance has not had time to be established, and in these the true nature of the disease can be discovered only after death.

In cases of less gravity the nervous symptoms predominate, and suffice for the diagnosis. They have more time for regular and complete development. But they manifest themselves in very various forms; sometimes delirium, sometimes local or general hyperæsthesia and pain, and sometimes paralysis, being more conspicuous than its associated phenomena. But the severe headache, and rigidity of the spinal muscles are never entirely absent, although they may in some degree remit. Deafness in both ears is a frequent but not a constant symptom. The severe nervous phenomena are so peculiar in their nature, extension, and intensity, that they suffice for the diagnosis.

In these cases of more moderate severity the general symptoms are not very characteristic. The fever is of various degrees of intensity, depending upon complications in the lungs, bowels, &c. How far the inflammation of the cerebral and spinal meningitis contributes to sustain and prolong the fever, it is difficult to estimate; it is only certain that exacerbations of the nervous symptoms and of the fever do not always coincide. In duration and elevation of the temperature the fever may resemble that of typhus, but is never so permanently sustained at the same height. It has more analogy with the course of the fever in acute tuberculosis, with apparent subsidence followed by sudden exacerbations, &c. At least during the earlier stages of the disease the frequency of the pulse is not proportioned to the increase of heat, and is even lower than normal; and, on the other hand, the pulse may subsequently, and even suddenly, become extremely frequent without any proportionate increase in the temperature of the skin. But when the pulse is frequent and when it is infrequent, the force of the heart's impulse is sometimes temporarily increased to as great a degree as in cases of acute insufficiency of the aortic valves.

The condition of the spleen is of some diagnostic value. It early increases in

size, but does not continue to do so, as it does in typhus. The appearance of the eruptions, especially of the herpes, in the course of the disease, is also an important element of diagnosis.

The constitutional symptoms can outlast considerably the more important signs of irritation of the nervous system, but, on the other hand, deafness and motor paralysis may continue long after the fever has disappeared.

Finally, in moderately mild cases, the cerebro-spinal symptoms also preponderate, but display themselves more individually, and less in combination with one another. Thus, severe headache and lumbar pain, rigidity of the spinal muscles and some spasmodic twitchings, deafness with motor paralysis, occur in various combinations and succession.

The constitutional derangement manifests itself by the enlargement of the spleen, the hemorrhagic tendency, the exanthema (especially herpes), and particularly by the contrast, already described, between the frequency of the pulse and the temperature of the skin. This is an extremely characteristic condition, and is hardly to be found in any other disease. A. S.

11. *Cerebro-Spinal Meningitis, and Typhus Fever.*—The editor of the *Brit. Med. Journal*, in an article in the number for July 8, 1865, in commenting on Dr. SANDERSON'S description of the cases of cerebro-spinal meningitis recently observed by him in Germany, observes:—

“This description, as we have said, suggests nothing more than acute cerebro-spinal meningitis. In comparing it with that of typhus, one is first of all struck with the contrast between the one and the other as regards their general characters and aspects, and the order of succession and grouping of the symptoms. Then, in pursuing the comparison further, special differences present themselves of so essential a nature, that, unless we assume them to be misrepresented, it is impossible even to place the two diseases next each other in the nosology, much less to admit their identity. We refer particularly to the relation in which the two principal symptoms, *pain* and *delirium*, stand to each other. In cerebro-spinal meningitis, violent delirium occurs immediately after the initial symptoms, often within twenty-four hours of the commencement of the illness; and is preceded and followed, if not accompanied, by violent pain in the head, neck, and back. In typhus, it is true, that there are both headache and delirium; but they are never combined. Headache is pre-eminently a symptom of the commencement. ‘About the end of the first week,’ says Dr. Murchison, ‘it ceases, and delirium supervenes.’ (*Continued Fevers*, p. 118.)

“There are other respects in which the dissimilarity of typhus and epidemic meningitis is no less striking. So complete, indeed, is the contrast between them, that it is scarcely possible to mention a single characteristic of the former which is also possessed by the latter. According to the distinguished author already quoted, the distinctive diagnosis of typhus rests mainly on the occurrence ‘of a rubeoloid rash between the fourth and seventh days,’ and on the limited duration of the malady; and, with respect to the discrimination between typhus and acute meningitis in particular, in doubtful cases, he expresses the opinion that ‘the presence of the eruption, or the exposure of the patient to the poison of typhus, can alone assist us.’ Now, as regards the duration of the disease, there is evidence, in the cases related or referred to in the report, to show that, in the first place, there was the greatest irregularity as regards the period during which the disease lasted; and, secondly, that in several cases convalescence did not commence until four or five weeks after the attack. With respect to the eruption, the evidence is most positive. No eruption, which was in the slightest degree analogous to the typhus rash, was met with in any case; while, on the other hand, another eruption—that of herpes labialis—was observed in the greater number of cases at various periods, but for the most part between the third and sixth days.

“The mode of invasion was remarkable.

“It usually happened that the patient was suddenly seized while following his ordinary occupations or at play, with shivering, vomiting, and headache. The occurrence of obstinate vomiting was almost universal. Of fifty-six cases in my notes in which this symptom was referred to, it was ascertained to have

occurred in fifty-one. It was of the most aggravated and uncontrollable character, the vomited matter consisting at first of half digested food, and subsequently of mucus stained with bile.'

"Very different is this from anything that ever occurs in typhus, in which, says Dr. Murchison, 'nausea and vomiting' are rare,' though they are common in every form of meningitis.

"From the frequency with which the muscles of the back of the neck become the seat of muscular contraction, the disease has acquired, in many parts of Germany, the familiar designation of *Genickkrampf*. This symptom Dr. Sanderson found to be so intimately associated with the existence of agonizing pain in the same muscles, that he is disposed to regard the contraction as more or less dependent on the pain; for the contraction was never of so extreme a character as to deserve the name of tetanic. So long as the neck remained retracted, the muscles felt relaxed; nor could any hardness be made out until it was extended. In this respect, the author would appear to differ from other observers, especially in Germany, most of whom have described the retraction of the neck as tetanic. But the difference is probably rather of names than of things; for it is admitted that the head was drawn back in nearly every case, although the degree of muscular tension fell short of what in this country we understand by the word 'tetanic.'

"Our space permits us to refer to one other set of symptoms only; viz., to the affections of the organs of sight and hearing, and of their functions, which occurred in the course of attacks of meningitis. Squinting was observed frequently; sometimes it was transitory; sometimes it lasted several weeks; and, in one instance, it was permanent."

12. *Epidemic Icteric Typhus*.—Dr. CARVILLE, Physician to the Maison central de Gaillon, observed among the prisoners of this institution an epidemic of jaundice, which lasted from May to October, 1859. It attacked forty-seven persons, of whom eleven died. Twelve other persons exhibited the symptoms of the malady, without the jaundice: of these two died. The persons chiefly affected by the epidemic were males who had passed the age of forty years, of vigorous constitutions and sanguine temperament. In his description M. Carville divides the disease into two periods, that of incubation, extending from the initiatory rigor to the appearance of jaundice, and the period of outbreak, from the manifestation of jaundice to the period of convalescence or termination in death. The mean duration of the two periods was nearly equal, and may be placed at six days, giving twelve days for the duration of the disease in its acute stage; but convalescence was extremely long, it generally lasted thirty-eight days. The following symptoms were observed: First period—Initiatory rigor, varying in intensity; cephalalgia, sometimes frontal, more frequently general, and always acute; general enfeeblement; the pulse sometimes a little above, sometimes a little below the ordinary frequency; temperature ordinary, severe thirst supervening, however, on the second or third day; diminution or suppression of the urine preceded the appearance of jaundice in severe cases, and followed it in the lighter cases, accompanied always by an alteration in the colour of the urine from its containing biliary principles; the sensibility of the epigastric region a little exaggerated; nausea and vomiting; the tongue coated, dry, or viscid; difficulty of breathing observed ten times in the first period, marking generally the second, and always in relation with the gravity of the disease; insomnia almost constant; constipation more frequent than diarrhœa; angina observed in seven cases, of which four were severe. Second period—A fresh rigor observed in twenty-two instances; aggravation of the headache; development of jaundice, the colour of which, generally deep, was in relation with the intensity of the attack; pulse a little slower, more feeble, irregular, sometimes intermittent; feebleness; watery or greenish vomiting; about the third day after the appearance of jaundice, epistaxis was observed in half the cases, being, besides two cases of hæmatemesis and three of purpura, the only hemorrhage observed, and being noticed in slight rather than severe cases; increased difficulty of respiration, hiccough, somnolence, and delirium preceded death. In the eleven fatal cases, post-mortem examination did not present the

same results; in two, yellow atrophy of the liver was observed; in a third, the lesion was less advanced, and the granular structure of the hepatic gland could still be recognized. In the eight other cases, the liver appeared unaltered in volume, colour, and texture. The kidneys were more often affected than the liver; but in five cases they presented no important modification. A more striking alteration was observed in the spleen; its structure was softened and sometimes almost diffuent in ten cases; the organ was hypertrophied in seven instances—twice, on the contrary, atrophied. The most important lesion in the intestinal tube was the existence in nine cases of an exaggerated condition of Peyer's patches near the ileo-cæcal valve, but without appreciable structural alteration. In one case, meningeal hemorrhage was observed, and in two others, engorgement of the vessels of the pia mater. The consideration of the variations in the post-mortem appearances, and of the twelve cases in which jaundice was not observed, has led M. Carville to the conclusion that the icteric symptoms were not the most important in the group of cases; he is led to look upon the adynamia as the most important phenomenon, and to consider the epidemic as one of typhus of a peculiar character, presenting considerable analogy with the yellow fever of America.—*British & Foreign Med.-Chir. Rev.*, July, 1865, *Archives Gén. de Méd.*

13. *Puerperal Mania*.—This disease was brought under the notice of the Obstetrical Society of Dublin (March 11. 1865), in a paper by Dr. LALOR, the Resident Superintendent of the Richmond Lunatic Asylum. During the seven years from November, 1857, to the present time, 39 cases of puerperal insanity had been admitted into the asylum, which, compared with the entire number of insane females admitted during the same period, gave an average of about 1 in 17, or nearly 6 per cent. Of these 39 cases, 19 were chronic at the time of admission. The author separates the class of cases in which the insanity has occurred within a month after childbirth, and has not been of more than one month duration at the time they came under his observation. Of such cases there were 19 distributed according to ages as follows: From 20 to 25 years, 6; 25 to 30, 8; 30 to 35, 4; and only 1 case beyond 35 years of age. The form of insanity was mania in 16, and melancholia in 3 cases. 15 of them recovered and 4 died. It was remarkable that the 3 melancholic cases all recovered. Sometimes the insanity was manifested, *inter alia*, by an inveterate tendency to sing or throw words and sentences into rhythmical order; sometimes in a desire at self-destruction, and not unfrequently in a disposition to use most indecent gestures and language; in some of these latter there was a habit of throwing up portions of their clothing and exposing their persons. To prevent this it was sometimes necessary to secure their dress with a lock. With reference to treatment, sedatives were in some cases administered, the most usual being the muriate of morphia in doses of from half a grain to a grain or more. Less than half a grain was seldom administered. Tonics, stimulants, and nutritious food were very frequently given, the lowering treatment being generally avoided. When the bowels were constipated moderate purgatives were administered, such as castor oil, or tincture of rhubarb, or aloes. When the patient was anæmic, iron or quinine was given. Blistering on the head and neck and behind the ears was sometimes, but rarely resorted to. Refusal to take food is sometimes met with in puerperal as well as in other forms of insanity requiring to be met promptly, as the consequent weakness and debility is a great obstacle to recovery. Food should be given three times, or at least twice a day. In administering food in these cases in which the patients refused it, he used the India-rubber syringes recommended by Dr. Tuke. It should always be borne in mind that in puerperal as in other forms of insanity mechanical restraint should as much as possible be avoided. Cutting off the hair he was averse to, unless when absolutely necessary for blistering; it was a measure which should be avoided unless some positive indication called for it. The loss of hair is very acutely felt by females as being indicative of a disease to which so much of degradation attaches, and the patient's stay in hospital after convalescence is sometimes protracted to allow the hair to grow. From his experience he would say that cutting the hair in cases of puerperal mania should be the exception rather than the rule.

With reference to the period when the patient might with safety be discharged, he was of opinion that in the convalescence from the acute form of puerperal insanity it was safe to discharge the patient after a short probation, as soon, in fact, as the restoration appeared complete and the bodily health good. Relapses under these circumstances were very infrequent. The anxiety of the patient to return home is generally very strong, and the refusal to gratify so natural a wish would be, generally speaking, unadvisable. Upon the important question of prognosis, one of especial interest in cases of puerperal insanity, Dr. Gooch, in his very able essay upon "Mental Disorders," distinguishes two forms of puerperal insanity; one attended with fever and rapid pulse; the other characterized by a very moderate disturbance of the circulation. The latter cases (which are the most numerous) frequently recover; the former generally die. The rapidity of the pulse is therefore an important element in prognosis. His (Dr. Lalor's) opinion was, that acute puerperal insanity must always be regarded as a very dangerous disease. The treatment recommended consists of nutritious food and stimulants, and the avoidance of lowering and debilitating medicines and measures. Such was the plan advocated by Dr. Gooch, and the general experience of the profession pointed it as the best and safest course.

In answer to a question of Dr. Churchill Dr. L. said chloroform had been resorted to in one case in order to produce sleep, and it certainly effected the desired object better than opium would have done. 'The case terminated fatally; but it was a case which could not possibly have recovered, no matter what mode of treatment had been adopted.—*Dublin Medical Press*, Aug. 16, 1865.

14. *Diarrhœa and Cholera*.—DR. JOHN CHAPMAN offers (*Med. Times & Gaz.*, July 29, 1865) some new views concerning the origin, proximate cause, and rational treatment of cholera. The following is a summary of his views:—

"1. That the *primary* cause of cholera is, as a general rule (liable to exceptions which will be indicated), the excessive heat of hot climates, and of temperate climates in summer when cholera prevails.

"2. That the *proximate* cause of cholera is of precisely the same nature as that of summer or choleraic diarrhœa, but that it is far more developed, and consequently that its action is proportionately more powerful and intense.

"3. That the general arterial contractions effected throughout the system by the vehement operation of the cause in question, viz., *extreme hyperæmia of the spinal and sympathetic nervous centres*, by depriving the capillary vessels in all parts of the body of their wonted supply of blood, induce the muscular debility, tremors, vertigo, impairment of respiration, cold breath, sense of faintness, coldness of the whole surface of the body, coldness and lividness of the lips and tongue, blueness of the entire surface of the body, the sunken and appalling countenance, and the fatal collapse characteristic of the disease.

"4. That the nausea, vomiting, copious discharge of the well-known 'rice-water stools,' cold sweat, and peculiar odour from the body, are due to the combined action of the hyperæmic spinal cord and sympathetic nervous centres, in the same manner as they induce phenomena of the like kind, though less in degree, in cases of summer diarrhœa, and of sea-sickness when it is accompanied with diarrhœa. (See my exposition of the pathology of Sea-sickness.)

"5. That cholera is neither contagious nor infectious in any sense whatsoever, except through the depressing influence of fear.

"6. That cholera may be completely averted, and, when developed, cured by the persistent application of the spinal ice-bag along the whole spine so long as any symptom of the disease continues."

15. *Sewage Exhalations the Cause of Dysentery*.—DR. T. S. CLOUSTON gives (*Med. Times and Gaz.*, June 3 and 10, 1865) an account of an outbreak of dysentery in the Cumberland and Westmoreland Asylum which he feels assured was caused by the effluvia from a field irrigated by sewage.

After describing the type of the disease, its pathology and treatment, Dr. C. draws the following conclusions from the facts he has observed:—

1. An epidemic of dysentery of a very fatal character occurred in the Cumberland and Westmoreland Asylum in the years 1864–65.

2. All the positive evidence that can usually be produced to determine the cause of any disease can be produced to connect this epidemic of dysentery with exhalations from a field irrigated by sewage, as effect and cause. Ample negative evidence can be produced to show that no other probable cause of such an epidemic was in operation.

3. The old, weak, paralyzed, and diseased patients were chiefly attacked, but it was not confined to them.

4. The majority of the patients attacked were inmates of the wards on the ground floor of the asylum, showing that the sewage effluvia is most concentrated near the ground. Little or no wind and a high barometrical pressure would seem to be the most favourable conditions for the injurious effects of the poison to manifest itself.

5. It would seem to be unsafe to apply sewage in any form to land with a stiff clay subsoil within 350 yards of human habitations.

6. Diarrhœa in its ordinary form may also be caused by sewage exhalations.

7. There are strong reasons for believing that the sewage effluvia which caused dysentery and diarrhœa in some persons may have caused typhoid fever in others.

8. The sewage poison had a period of incubation in most cases before the dysentery appeared. The length of this period was probably from three to five days.

9. The dysentery was of a very fatal character, and the ipecacuanha treatment, so successful in tropical dysentery, was not so in this epidemic.

10. The two morbid appearances most characteristic of this epidemic were, 1st, a soft membranous deposit on the mucous membrane of the intestines; and 2d, the diseased condition of the lower part of the small as well as the large intestine in all the cases.

11. The poison which caused the dysentery seemed to occupy an intermediate position between the poison which causes the continued fevers, and that which produces ague and its concomitants.

Dr. C. L. ROBERTSON opposes his experience at the Sussex Lunatic Asylum to that of Dr. Clouston. "This asylum," Dr. R. states, "contains 500 patients, and is situated on an elevated range facing the South Downs. The soil is heavy clay (the Sussex weald; but it has been well drained throughout since it came into the occupation of the county.

"The asylum was opened for the reception of patients in 1859. No cases whatever of fever or dysentery or any diarrhœa, save such as naturally follows the course of phthisis, etc., have occurred during the six years the asylum has been open. The drainage and sewage of the asylum are mixed together, and pass in earthenware pipes through small tanks, made for the purpose of watering the vegetable garden by pump and water-pots, direct on to the grass land, to which it is throughout the year applied, unfiltered in any way, by surface irrigation. The only precaution used is the daily addition of a mixture of carbolic acid, lime, and water to the sewage. This mixture is poured every morning into the garden tanks, and the yearly cost of this disinfectant is about £5. The sewage passes on the land entirely free from smell. I am constantly myself superintending the irrigation, and I never experienced the slightest inconvenience or unpleasantness. The meadows irrigated are within 225 yards of my quarters, and I should not have the slightest objection, were the sewage thus disinfected, to see it flow within twenty-five yards of my windows.

"The result is a mine of wealth. We have nearly forty acres of meadow and Italian-rye grass thus irrigated, and I am now cutting the second crop of rye grass. I carried home the first portion of my hay crop on the last day of May.

"The system of irrigation was planned and carried out under the advice of Mr. Alderman Mechi by Mr. King, C. E., who was also introduced by me to Dr. Thurnam, for whom I believe he has carried out similar works at the Wilts Asylum. The entire cost here was £3 an acre. The meadows before irrigation were hardly worth £1 an acre; I should now willingly rent them at £5 an acre. The manner in which the sewage rye grass increases the richness of the cream and butter is almost incredible.

"In reading Dr. Clouston's paper, it appears to me that he erred in using the

sewage undiluted by the water from the baths and lavatories. He also appears to have collected the solids in a large tank, and apparently not to have used disinfectants. Also he admits that the fluid sewage was roughly and unscientifically allowed to run over the fields, probably forming small pools and deposits."

16. *Is there any Foundation for the Hypothesis of the Origination of Disease by Zymosis or Ferment?*—In a discussion of this question at the recent meeting of the British Association, Dr. RICHARDSON began by stating that the hypothesis that, in certain diseases, there is a fermentative process analogous to the fermentation of wine, was first advanced by Willis in the seventeenth century; and the hypothesis had held its ground until now. Was it true? It might be admitted that the introduction of certain organic poisons into the organism was followed by a divergence from the ordinary standard of health; whether the poison were introduced into the blood from without, as in vaccination and syphilis; or from within, as in rheumatism. The diseases which seemed to be produced by such action of poisons were—smallpox, vaccinia, syphilis, gonorrhœa, rheumatism, scarlet fever, diphtheria, measles, typhus fever, typhoid fever, cholera, pyæmia, glanders, hydrophobia, and, perhaps, tetanus. Dr. Richardson said these poisons were separable—as separable as snake poisons. He relates a series of experiments bearing on the separation of one form of pyæmic poison. He doubted the cellular character of the poisons as necessary to their construction, but said they were nitrogenous. They were all neutralized by bromine and by mercurial salts; and they seemed to form salts with hydrochloric acid, as morphia does. They were probably organic alkaloids, of the ammonia type. Of these poisons, some might be derived in the first instance from without the organism, and even from the vegetable world; but, in many instances, they were products of the body itself—secretions or excretions—modified either by the oxygenation of the blood, or by exposure to the air out of the body, and by peculiar decomposition. The natural secretions of some animals—as the snake secretion—were poisonous to other healthy animals; and human saliva was poisonous to inferior animals, such as rabbits. The poisons differed in their action; and the same poison might produce different symptoms. Thus scarlet fever poison might cause malignant fever or mild fever. Dr. Richardson was of opinion that this depended on the organic constitution of the poison itself at the period of its absorption. The poison of pyæmia, which was present in the secretions of wounds, could produce two forms of disease—one in which the leading signs were those of typhus; another, in which they were those of inflammatory fever, with fibrinous separation and fibropurulent deposits. In the first class of cases, the poisons acted immediately on the blood, causing death from direct interference with the process of oxidation. In the latter class, the action was more prolonged; and new products of oxidation, lower than carbonic acid, were the result; these lower products—acids, such as lactic—acted as secondary poisons. In some diseases, the secretion first poured out might be simple; but when exposed to air it underwent change, became poisonous, was absorbed, and led to death from secondary action. In this manner, simple diseases often assume a fatal form. A common illustration of this fact was afforded in tonsillitis merging into diphtheria from secondary absorption. The quantity of poison introduced into the system, or the rapid absorption of the poison, intensified the symptoms, but did not alter the type. The type was changed by the action of the air on the poison, and by the stage of the decomposition of the poison. The author held that there were conditions of the atmosphere in which these poisons underwent specific changes, giving rise to special disease. He accounted for surgical fever in this manner. The influence of the poisons in every case was on the blood, and was most simple. The poisons all, more or less, prevented free oxygenation; and thus they changed the character of the secretions of the body, rendering them in turn poisonous, and capable of reproducing their likes. In conclusion, Dr. Richardson urged that there was no foundation for the theory of zymosis, in the common acceptance of that term, *i. e.*, there was no propagation of the poison in the blood by formation of such poison from cell to cell. The process consisted in transformation of the natural parts of the organism, not in the production of new organic developments cell by cell.—*Med. Times and Gaz.*, Aug. 26, 1865.

17. *Epilepsy Successfully Treated by Bromide of Potassium.*—M. BAZIN has successfully treated a case of epilepsy by the bromide of potassium. The patient was engaged in trade, forty years of age, of a sanguine temperament and robust constitution, but he had sunk into a melancholic condition; and one day he fell down in the public streets in an epileptic fit, which was succeeded by other attacks, recurring more and more frequently, until at last several occurred in the same day. In proportion as the attacks became more frequent the intellectual faculties were altered, as well as the functions of nutrition. Under these circumstances M. Bazin administered the bromide of potassium in progressive doses, and this treatment was immediately followed by a cessation of the fits; and in five months from the time when the treatment was commenced there had not been a single attack, and all the physical and intellectual functions were restored. In three other cases of epilepsy, in private practice, M. Bazin found the bromide of potassium equally successful, although the disease had previously resisted different kinds of treatment. The mode of administration adopted by M. Bazin was to form a solution of the bromide in the proportion of 20 grammes (a gramme is about 15 grains), to 300 grammes of distilled water; two tablespoonfuls of this solution, representing 30 grammes, contained 2 grammes of bromide. In the adult he commences at once with this quantity of two spoonfuls—one dose in the morning, and one in the evening, before meals. Every five days the dose is increased progressively by one spoonful, up to eight or ten spoonfuls a day. This last dose is continued more or less, according to the degree of resistance of the disease. When the attacks are evidently modified, the quantity of the medicine is diminished in an inverse progression to four spoonfuls a day, a quantity which is continued for several months, even after the cessation of the attacks. In children the medicine is given in the same manner, substituting a teaspoonful or less for the larger doses, according to the age of the patient.—*British & Foreign Med.-Chir. Rev.*, July, 1865, from *Gazette des Hôpitaux*.

18. *Tubercular Meningitis Successfully Treated by Bromide of Potassium.* M. GUBLER considers that the bromide of potassium exercises a contra-stimulant action on the nervous centres, at the same time that it moderates and retards the movements of the heart; and if this view be correct, the salt ought to prove serviceable in affections of an inflammatory nature occurring in the brain; and tubercular meningitis might by its use be removed from the category of incurable maladies. M. BAZIN relates a case in which the bromide was successfully employed. The patient was a youth of nineteen years old, but who appeared younger, and had been subject to convulsions since infancy, and had had pulmonary symptoms indicating the commencement of tuberculosis of the lungs. While undergoing treatment for a skin affection he was seized with cerebral symptoms of an inflammatory character, and exactly resembling those of meningitis. Among the other marked symptoms there were insensibility, vomiting, and convulsions. M. Bazin determined to try the bromide of potassium, of which he gave one gramme in solution the first day (a gramme is about 15 grains). The next two days he gave two grammes a day. The day after there was a slight improvement, and the patient appeared to return somewhat to his senses, and the fits were less violent; the bromide was continued in the same dose, and a blister was applied to the nape of the neck. The two succeeding days the improvement was more marked, and the dose of the bromide was increased to three grammes, and afterwards to four grammes a day. Under this treatment the progress of the case became more and more satisfactory: the pulse fell, the fits ceased, there was tranquil sleep, and the digestive powers returned. But in proportion as this improvement took place in the cerebral symptoms, the abdominal and thoracic regions exhibited undoubted signs of advancing tuberculosis. The reporters of this case think that it ought to encourage practitioners to employ the bromide in similar circumstances.—*Ibid*.

19. *Treatment of Croup by the Inhalation of Lime-Water.*—M. KÜCHENMEISTER, of Dresden, has stated that diphtheritic membranes are rapidly dissolved in lime-water; and this statement has been confirmed by M. BIERNER,

the Professor of Clinical Medicine in the University of Berne, who has repeated the experiment before the students of his class. Some pseudo-membranous exudations, of considerable extent and thickness, were placed in a small glass of lime-water, and in the space of from ten to fifteen minutes, and before the eyes of the students, they disappeared, leaving only a very slight sediment at the bottom of the glass. M. Biermer was therefore induced to apply the lime-water locally in a living patient, and he has published the results, which were quite satisfactory. The patient was a girl, aged seventeen, admitted into the hospital of Berne for croup, which had lasted four days. When she was admitted she was nearly choked, cyanotic, and insensible, and she threw up portions of membrane only by means of the administration of some very strong irritant medicines. The symptoms of laryngeal constriction still continued, together with distressing dyspnoea; and pulverized water was employed to moisten the respiratory passages. The water employed, which was at first hot, and then boiling, produced considerable amelioration; and M. Biermer, having previously tried the experiment mentioned above with the false membrane and lime-water, supplied the pulverizer with lime-water. The improvement was evident as soon as the inhalations were commenced; the symptoms diminished in intensity; the expectoration changed its character, and became purulent; the cough gradually disappeared, and the fever abated; and only hoarseness and a slight cough remained during the convalescence, which terminated in a complete cure. M. Biermer, and all those who watched the progress of the case, were convinced that the inhalations had a solvent effect upon the false membranes; but the Professor does not recommend an exclusive adoption of this local treatment, which softens and detaches the exudations, but does not reach the cause of the disease, which must be combated by constitutional remedies, calomel being considered the chief. The plan of M. Biermer has been followed by other practitioners; and M. Küchenmeister has published a case of diphtheritic pharyngo-laryngitis in a child of three years and a half old, treated in the same manner with complete success. Dr. Brauser, of Ratisbon, has also lately published a case of croup in a child of four years and a half old, treated in the same manner, and perfectly cured. M. Biermer insists particularly on the necessity of using the injections hot.—*British & Foreign Med.-Chir. Rev.*, July, 1865, from *Bull. Gén. de Thérap.*, April 15, 1865.

20. *Tuberculosis: its Treatment by the Local Application of Iodine; with a Case of Pulmonary and Lumbar Abscess Dependent on Caries of the Vertebral Column.*—This is the title of a paper recently (June 13th) read by Dr. A. WYNN WILLIAMS before the Royal Medical and Chirurgical Society. The author, after alluding to a paper read before the Society in 1860, wherein he recommended the application of a weak solution of iodine, covered with impermeable cloth, in scrofulous diseases of bone, etc., stated that he had since treated tuberculous deposits in a similar manner when situated in any or every part of the body with more beneficial results than he had seen produced by any other means, using for the purpose flannel wetted with a solution of iodine, ℥iij of the compound tincture of iodine to ℥viiij of water, covered with an impermeable material, the object to be attained being the permeation of the iodine into the tissues of the body. This plan need not interfere with the administration of other suitable remedies as a rule, excepting in tuberculosis within the cranium and periosteum. The tuberculous diathesis does not bear the internal administration of iodine or its salts. Mercury in any form is injurious. The author stated that he considered the tuberculous diathesis to consist in the diminution of the red particles and an excess of fibrin. When such is the state of the blood it requires some local irritation whereby hyperæmia is induced, some of the fibrin is obstructed, and becomes the nucleus of the gray tubercle, which is thus from its commencement of low vitality. He pointed out the changes Nature herself sets up in tubercle, showing that the gray or transparent tubercle is at first under the influence of the circulating fluids, but is soon converted into the opaque or yellow. The cause of the opacity of tubercle and ultimate removal from the influence of the vital current—in fact, its death by pressure—is the imbibition of liquid material from the surrounding parts, evidenced by the great increase in

oil-globules; it is questionable whether the oil-globules are deposited as such, fibrin being converted by certain substances, as alcohol, into an oily matter. There is also a great increase in the calcareous matter, the lime, when first imbibed, being probably in a liquid, transparent state, becoming opaque by combining with carbonic and phosphoric acids, products of the decomposition of animal matter. As the case proceeds, the liquid and gaseous matter would appear to be removed by exudation, nothing but a calcareous mass remaining. In some cases also the oil-globules are converted into a crystalline or putty-like mass. Then follow extracts from Dr. Williams's work on the *Principles of Medicine*, showing the destructive influence of tubercle during the different stages of its growth, softening and formation of vomica, with the injurious influences caused to the system in the shape of night-sweats, colliquative diarrhoea, etc. etc. In the treatment necessary to counteract the tuberculous diathesis, the aim of the physician must be to maintain a due balance of power amongst the various constituents of the vital current. If the democratic or poorer elements should be in excess, their influence must be counteracted by encouraging the formation of the richer or more aristocratic. The physician must endeavour to promote the removal of the fibrinous deposit of gray tubercle in its earliest state before it becomes aplastic; and this is best attained, in addition to remedies calculated to strengthen the system, by applying a weak solution of iodine, covered with an impermeable material, over the seat of the deposit. That iodine does remove this deposit the author has no doubt. The want of success in the use of iodine in this country he attributes to three causes: 1stly, the employment of the salts of iodine instead of iodine *per se*; 2dly, the administering it internally, and in too large doses; lastly, its being applied externally in too concentrated a form. Iodine, when applied in the manner recommended by the author, acts as a rubefacient over a larger or smaller surface, and can be modified at will; and is not limited to the cutaneous surface, but penetrates the deeper tissues, increasing the action of the parts around the fibrinous deposits, promoting their absorption, and preventing their conversion into fatty matter. It combines also with the lime, forming a soluble salt of lime readily eliminated from the system, preventing the transparent cacoplastic tubercle from being converted into the opaque aplastic one. The beneficial influences of iodine are not limited to the first stage of tubercle, although the same advantages accrue to any fresh crop. It exerts a powerful influence over the yellow tubercles, preventing their increase in size by removing the materials from which that increase takes place—the oily and calcareous matter. In the stage of softening and formation of vomica and abscesses, a most important property of iodine comes into play—that of a disinfectant—rendering the noxious gases powerless to affect injuriously not only the parts in contact with the tuberculous masses, but by their absorption into the circulation, the whole system. The author remarked that he had only appended one case to the paper, observing that the following passage in *Lugol on Scrofula*, by Dr. Ranking, warranted his doing so: “I am not acquainted with a single well-authenticated instance of the cure of lumbar abscess arising from caries of the vertebral column.”—*Med. Times and Gaz.*, July 8th, 1865.

21. *Tincture of Iodine in Saccharine Diabetes*.—Dr. BÉRENGER-FÉRAUD states (*Bull. Gén. de Therap.*, April 15, 1865) that he has been induced to employ the tincture of iodine in the treatment of diabetes on the recommendation of Dr. Ricord; and although he has treated only two cases, the results appear to him sufficiently interesting to be recorded. In the two cases described, the treatment was renewed, twice in one, and three times in the other, and always with success. The author also observes that he has had the rare opportunity of observing the progress of diabetes in a monkey, and has in this instance also successfully tried the tincture of iodine. Dr. Bérenger-Féraud records in detail the results of his observations from day to day on the two cases of diabetes in the human subject, giving the density of the urine, the relative amount of glucose, and the quantity of tincture of iodine administered. The mode of giving the iodine is very simple, and consists solely in employing the tincture of iodine of the French Pharmacopœia, containing eight parts to

a hundred of spirit. Five drops of this tincture were given at first, and the quantity was gradually increased up to twenty drops a day, administered in 100 grammes of water. At first, the smell of the drug produces a rather disagreeable effect, but at the third or fourth dose the repugnance to its use is very much diminished, and soon disappears entirely; as was proved not only in the two diabetic cases, but in many others, including Dr. Bérenger-Féraud himself. The physiological and therapeutical effects observed were, in the first place, those which are caused by the gentle action of iodine upon the system; and in relation to the diabetes, the proportions of glucose, which diminished during the first or second day, again increased in the urine. The improvement at first obtained remains stationary, and even retrogrades, unless the use of the iodine is discontinued; and the author remarks as a curious circumstance, that under the influence of this suppression of the medicine the proportions of glucose again begin to diminish, at the same time that the urine again becomes less abundant. The quantity of glucose in the urine then remains at its minimum for a certain number of days, to augment again, if the patient makes any deviation from his regimen, and neglects to follow carefully the hygienic precautions which the diabetic sufferer ought constantly to observe.

The author does not assert that a few drops of tincture of iodine have the power of curing diabetes, or that hygienic or dietetic measures are of inferior importance; but he thinks that the tincture of iodine is able to cause a rapid diminution in the quantity of the diabetic sugar; and this action is very valuable, although it may be of a secondary nature. Besides the facts recorded by Dr. Ricord, Dr. Debout, and by himself, Dr. Bérenger-Féraud thinks that the action of iodine in glucosuria is a subject of the deepest interest to pathologists, because on several occasions successful results have been recorded from the employment of substances resembling iodine in their nature—as, for instance, chlorine. Several French and English practitioners, in fact, have recommended hydrochloric acid in the treatment of diabetes, but this acid is, in the opinion of the author, entirely contraindicated in that disease.

22. *Means of Averting Death from Chloroform.*—Dr. J. BULLAR, of Southampton, states that a plan has been successfully practised in the hospital of that place, for reviving those who are sinking from the administration of chloroform. This plan consists in the assistants at the operation striking the patient with the flat hand in the most vigorous and rapid way on all exposed parts of the skin (the trunk, the legs, the arms, and the face), and to continue this until the pulse and breathing return. The mouth is also kept open and the tongue drawn forward.

In one case, which Dr. Bullar briefly notices, he says: "It is difficult to estimate the time, but certainly from five to ten minutes elapsed before the heart acted, and not until both legs were blue with ecchymoses. Had not the staff of the hospital had faith in this remedy, the case at one time seemed so hopeless that other plans might have been attempted and time lost; but this faith is necessary for perseverance. Every part of the skin should be rapidly exposed, and every one should assist and strike with his flat hand as sharply and rapidly as he can, and continue it.

In this instance the immediate local effect in filling the parts of the skin which were struck and around them with red blood whilst the heart and breathing had ceased, shows that this plan is a stimulus of the reflex nervous function of a very vigorous kind, which can be immediately applied to the cutaneous ends of the nerves over a large surface without any apparatus, and with the greatest ease.

As the sympathetic nerve presides over the capillaries, and over the heart, the excitement of both by this means is readily explained by the direct communications of the ganglia of the sympathetic with the roots of the spinal nerves. According to the doctrine of the co-relation of forces, the mechanical force of the hands of the strikers is converted into the nerve-force of the patient, and is conveyed by the sensitive nerves of the skin to the spinal cord, and is reflected from it, through the sympathetic, to the heart and capillaries.—*Med. Times and Gaz.*, July 29, 1865.

23. *Necessity of Milk in place of Wine in the Treatment of Fever.*—Dr. GAIRDNER strongly lauds the value of milk in the treatment of fever. He says (*Lancet*, January 21, 1865.) “You must feed your patients, and you must feed them chiefly on milk. Milk or buttermilk is with me the staple food in typhus; and I will even say that I know no other food that can be depended on. Yet I see, and always see with a new surprise, descriptions of the treatment and dietetics of fever in which not a word is said about milk, and a great deal about beef-tea, wine, whisky, brandy, and all manner of things supposed to be more strengthening, or stimulating, than milk diet. Now, I tell you frankly that treating fever patients without plenty of milk is a thing that I do not understand at all; for I suppose I have not treated a single case of fever of any kind for the last fifteen years (I cannot make precise statements beyond that date) without milk, and I always proceed on the understanding that milk in fever is the one thing needful as diet—always to be given, and given liberally, whether specially ordered or not. To give wine, whisky, and beef-tea, while withholding milk, is simply, in my opinion, to destroy your patient; and the more wine or whisky you give, while withholding milk, the more sure you will be to destroy your patient soon, because you are thereby superseding the natural appetite (or what remains of it) for a nourishing and wholesome diet, by a diet—if it can be so called—which poisons the blood and checks the secretions, and alters for the worse the whole tone of the nervous system and of the digestion and assimilation. I believe that infinite mischief has been done in typhus fever, and in all fevers, by giving wine, and withholding or not giving milk. Under a false theory of administering alcoholic food, it has resulted, not only that natural and genuine food has been withheld, but that the small remaining amount of appetite for such food has been obliterated, and not unfrequently, even at an early stage of the disease, the patient has been practically disabled from taking any proper nourishment at all. I know, unhappily, as a fact, that not only doctors, but nurses and patients and patients’ friends are readily brought under the influence of this fatal delusion, that alcoholic liquors can, in fevers, take the place of natural food. But it is none the less a fatal delusion, which I warn you solemnly against; all the more that the patient is absolutely in your hands, and you can obtain no guidance from his natural instincts, if you begin by overwhelming them with large doses of alcoholic stimulants. I have been very careful, at least for fifteen years past, to avoid this error, and I believe that any success I may have had in managing fever has been more due to this than to any other cause. But I allude to the matter now simply to say that if you would observe the natural or normal course of typhus fever, with respect to the crisis (as proposed at present), you must absolutely make up your mind to feed your patient naturally, and not to stimulate him. An opposite course leads to consequences which I may consider more in detail on another occasion; but what I am anxious to say now is, that it tends to disturb the course of the fever, and to retard the crisis.

24. *A New Method of Administering Sulphate of Quinia in Periodical Affections.*—The question as to the time of administering quinia in periodical affections has hitherto been, whether it should be given before, during, or after the paroxysm; but Dr. S. AUGÉ thinks that the question ought to have been, how long after the ingestion of the drug does its maximum action manifest itself? In his opinion it is necessary to solve this problem, and to administer the quinia in such a manner that its action may be developed exactly at the moment when the paroxysm appears, and in this manner the complaint will be best attacked and relieved. Dr. Augé remembered that he heard it taught in the Medical School of Paris that the maximum of action was from eight to nine hours after the drug was taken, and he therefore determined to administer it so that this action should coincide with the commencement of the paroxysm. Some cases presented themselves in which the ordinary treatment had been tried and had failed, but Dr. Augé advised that the quinia should be administered in small doses ($1\frac{1}{2}$ grain in 15 powders) nine hours, seven hours, and five hours respectively, before the paroxysm, and this practice proved to be remarkably successful. In one case of quotidian fever, the patient had taken 23 grammes

(a gramme is about 15 grains) of quinia in the ordinary way, without any good effect; but on administering the small doses in the manner just indicated, a cure was accomplished in two days. Dr. Augé proceeds to observe that this mode of giving the sulphate of quinia is evidently rational, and presents great advantages. In the first place it is economical, because the medicine is given in small doses, and it is better borne by the patient; and in the next place, a very common inconvenience is prevented, namely, poisoning by quinia (cinchonism), which often alarms patients. There is, however, one inconvenience attending this treatment, namely, that the hour of administering the medicine often happens to be in the night; but this circumstance is but trifling when our object is to cure an intermittent fever, or still more a severe attack of neuralgia. —*British & Foreign Med.-Chir. Rev.*, July, 1865, from *Bull. Gén. de Thérap.*, May 15, 1865.

25. *Habitual Use of Purgatives.*—Dr. RADCLIFFE considers the habitual use of purgatives to be needless in all cases, and harmful in very many. He states that the bowels will act well enough if the diet be properly regulated; and he argues that the natural way of preventing constipation is to take care that the food be not deficient in oily and fatty matters, and (in suitable cases) in green meat. He states, also, that the cases in which purgatives are habitually resorted to are very generally cases of old age and of debility in various other forms—cases in which the constipation which it is intended to correct is a salutary condition rather than otherwise. He argues that the kind of diet most suited to the wants of the system in all these cases is one which (by the exclusion of the more indigestible and innutritious kinds of food) does not dispose to frequent stools, and in addition to this, that the same result is brought about in some measure by the digestion being much slower than it is in vigorous health. In these cases, in fact, he argues that constipation, within certain limits, is a state to be encouraged rather than a state to be corrected; and he protests against the common notion that the bowels ought to act every day, as a practice which is nearly as bad as that of Sancho Panza's mock doctor at Barataria, which was to take away the dish from the table before there had been time to make use of it.—*Med. Times and Gaz.*, August 19th, 1865.

26. *Case of the Hemorrhagic Diathesis.*—Mr. MORRANT BAKER reported to the Royal Med. and Chirurg. Soc., June 13th, the following case of this, for the opportunity of seeing and recording which he stated he was indebted to Mr. Paget and Dr. Allan, and for some part of the history to Dr. Mott. The subject of the disease was a man, 23 years old, who was strong and healthy until he came up from the country to live in London. Soon after his removal, he seemed to be suffering from disease of the kidney, but recovered quickly on returning to the country. Soon after his coming to town, however, for the second time, he again fell ill with much the same symptom as before, but, also, there appeared on the cheek, near the angle of the mouth, a small swelling, like a minute boil or acne pimple, which, after being accidentally rubbed, bled profusely, at short intervals, for a fortnight; and it was thought that he must have lost, altogether, two quarts of blood in this time. The bleeding then ceased, and did not recur for nearly a twelvemonth. At the end of this time another small pimple, which had recently appeared on the face, began to bleed with great violence, the blood spirting out forcibly to the distance of a foot or more from the patient, and its flow being almost uncontrollable, except by firm pressure. On this occasion the hemorrhage continued until a common-sized wash-hand basin was nearly full of blood, notwithstanding the efforts made to stop it by pressure, powdered matico, etc., and at last by the actual cautery. The flow of blood ceased after some hours, but began again on the following day, until a considerable quantity of blood (although less than on the last occasion) had been lost. Similar hemorrhages took place at intervals for about seven weeks. Sometimes, and most frequently, more or less blood was lost every day, the quantity varying from an ounce or two to half a pint; at other times, one or more days passed without any hemorrhage at all. The longest interval, however, with complete absence of bleeding during the seven weeks was only four

days. The bleeding was chiefly from the pimples on the face, but sometimes the nose bled also. In small quantities, too, blood was occasionally present in the feces and in the matters rejected by vomiting. It was also constantly present in the urine. The blood was said to clot always more or less firmly. A specimen that the author saw and examined carefully looked, in every respect, like ordinary blood, and had separated in the usual manner into clot and serum. There was much general illness accompanying the hemorrhages, and more than could be accounted for by the anæmia which was caused by the loss of blood. No disease of any special organ could be discovered. Nothing very definite could be assigned as a cause of the patient's illness, and until it began it had never been noticed that slight wounds caused any large or long-continued hemorrhage, although he thought he was always, as he expressed it, "inclined to bleed." None of his family were particularly subject to losses of blood, with the rather doubtful exception of his mother. No treatment seemed to do any good so long as he remained in London, and he was, therefore, removed into the country about two months after the recurrence of the hemorrhages. Within three days after his removal he began to improve, and gradually recovered almost his former health and strength. About two months after his removal he again returned to his house in town, and again, as if from the change, became ill, although no return of hemorrhage took place. Soon afterwards he left London permanently, and eight months afterwards was reported as quite well. After the description of the case, the author proceeded to point out, in the first place, the differences between the idiopathic (of which this was an example) and what might be called the traumatic variety of this diathesis, and quoted cases of somewhat the same kind from Grandidier, Wachsmuth, etc. He then noticed the symptoms peculiar to the present case, and their differences from those of purpura, which in some respects the disease resembled. He concluded by noticing the great good that seemed to be derived from change of air after all other treatment had been tried in vain.—*Med. Times and Gaz.*, July 8, 1865.

27. *Non-Transmission of Syphilis by Vaccination.*—A paper by Dr. BOECK, of Christiana, was read before the British Medical Association at its late meeting at Lexington, in which the author stated that he had most carefully examined the question whether syphilis could be transmitted by vaccination, and had been unable to find any evidence in favour of such transmission either in published records or from experiments performed by himself. He related instances in which he had vaccinated syphilitic children, and had endeavoured, but without producing any result, to inoculate with the matter obtained from them two patients suffering from elephantiasis. He considered that no doubt should be thrown on vaccination unless on the most convincing evidence; and, while he did not deny that syphilis might be transmitted by vaccine matter, he must withhold his belief that such an event could occur until he saw it. The facilities for observation were great in Norway; but the transmission of syphilis by vaccination had never there been observed.—*Med. Times and Gaz.*, August 19, 1865.

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

28. *Are there any Antecedent Conditions Influencing the Production of Cancer?*—At the discussion of this question during the recent meeting of the British Medical Association, Dr. CHARLES MOORE, of the Middlesex Hospital, said that in this inquiry there must be agreement as to the conditions and the period of the disease which were to be the subject of discussion; and he expressed his own conviction that cancer commenced at the appearance of the first tumour. At the terminal examination of a case of cancer there might be tumours throughout the body; but one of them had preceded all the rest, and one, in many instances constituted the solitary and the fatal malady. To what

antecedent conditions could this first tumour be traced? It had been alleged that there was a prior disease of the blood; but neither chemistry, the microscope, nor argument had established that allegation as a fact. Dr. Fenwick had discovered changes in the gastric and intestinal mucous membranes of persons dying of cancer, but had not been in a position to demonstrate these or any other changes previously to the outbreak of the disease. Local irritations, both abundant and various, had their part as causes; but they were not of themselves adequate to produce cancer. The remaining occasion supposed to initiate cancer was comprised in the notion of its constitutional nature. This notion Mr. Moore examined at some length. The constitutional nature of cancer was held to be proved by the following chief reasons: 1. Its final universal diffusion in the body; 2. Its growth in various textures; 3. Its supposed outbreak in many tumours simultaneously; 4. Its local occurrence after operations on the primary disease; 5. Its appearance in internal organs, notwithstanding its final extirpation from its first seat; 6. Its repetition in members of the same family; 7. Its relation to tubercle. These facts in some cases, and the bearing of others on the question of the constitutional nature of cancer, Mr. Moore contested, calling especial attention to the remarkable manner in which cancer was inherited as a local disease. He then gave reasons for concluding cancer to be primarily a local disease. 1. Its invariable origination as a single tumour. 2. The dependence of the later tumours on the first, as proved by—*a*, the similarity of the morbid substance in various textures and distant organs; *b*, the order in which it is disseminated; *c*, the delay, the progress, and dispersion of cancer by operation; *d*, the possibility of its extirpation by an early and adequately extensive operation. 3. Its heritableness as a local more than as a general peculiarity. 4. Its preference of the healthiest persons. In this last fact was comprised the chief observation as to the antecedent condition of those who become subjects of cancer. Their previous life has been eminently healthy; their appearance when attacked is healthy; the adjoining tissues are natural; longevity is remarkable in the parents of these persons; those attacked are generally the strongest and often the eldest of a family; the disease increases numerically with the wealth and well-being of the nation; and it prevails in great excess in the healthiest divisions of the country.

Dr. Richardson said that both Dr. Moore and himself had arrived at the conclusion that there were certain spots where cancer was rife, and other spots where it was comparatively rare. Both of them had, for instance, fixed on Norwich as an illustration of the first kind, and on Reading as an illustration of the second. The association might consider there was fair ground for the inference—quite a new inference—that cancer was under the influence of certain local or social conditions which materially influenced its development.—*Med. Times and Gaz.*, Aug. 26, 1865.

29. *Morbid Changes in the Stomach and Intestinal Villi present in Persons who have died of Cancer.*—Dr. S. FENWICK read before the Royal Medical and Chirurgical Society (June 27) a paper on this subject, the object of which was to induce the pathologist to examine the blood-making organs in cases of cancer, instead of confining their attention to the structure and development of the tumour. The microscopical examinations of the stomach and intestines in fifty-seven cases of cancer were given. In fifteen cases the breast was the organ affected by the cancer, and in eleven the mucous membrane of the stomach was atrophied, the solitary glands were enlarged, and the gastric tubes adherent or destroyed. *Chemically*, there was an excess of fat in the mucous membrane. *Physiologically* examined, there was a deficiency in its power of dissolving albumen. In four cases the microscope showed no appearance of disease. Twenty-four were cases of cancer of the uterus, and in only three was there any serious disease of the gastric mucous membrane, but in five other cases the tubes were unusually adherent. *Chemically*—in some there was an excess of albumen, in others of fat, and in others a large amount of gelatine could be extracted. *Physiologically* examined the power of digesting albumen was lessened. There were eighteen cases of cancer of other parts of the body, and the condition of the stomach varied according to the part affected. Brunner's glands, the villi,

and intestinal tubes, presented similar appearances of disease. The villi in some cases were in a state of fatty degeneration, in others the basement membrane was greatly thickened and the number of nuclei increased. The most general form of disease was a deposit of pigment in the villi. Although the author was of opinion that the facts were not sufficient to enable him to determine whether these diseased conditions were the cause of the cancer, or only a result of some other pathological condition producing both, he thought the subject worthy of the attention both of pathologists and practitioners of medicine.

30. *Pathology of Tetanus*.—Mr. J. LOCKHART CLARKE, in a communication to the Royal Medical and Chirurgical Society (June 27, 1865), described the condition of the spinal cord in six cases of tetanus. In every one of these there was not only more or less congestion of the bloodvessels, but there were also definite, and frequently extensive, lesions of structure, such as have never yet been discovered. These lesions consisted of disintegrations of tissue in different stages of progress, from a state of mere softening to that of perfect fluidity, and were accompanied by certain exudations and extensive effusions of blood. They were found chiefly in the gray substance, which, moreover, was in many places strangely altered in shape—unsymmetrical on the opposite sides, or partially fused with the adjacent white column in a common softened mass. Although lesions of this kind existed, in one form or other, in every region of the cord, they were absent in some places; nor did they ever, for long together, maintain the same shape, size, or appearance, but were constantly and alternately increasing, diminishing, or disappearing, at short but variable intervals.

These lesions in tetanus are precisely similar in character to those which the author has discovered in the spinal cords of many ordinary cases of paralysis; and on comparing together the lesions and symptoms of both kinds of diseases, he finds good ground for the support of the following conclusions:—

1st. That the lesions are either not present, or are present only in a slight degree, in those cases of tetanus which recover.

2d. That they are not the *effects* of the *great functional activity of the cord* (manifested in the violent spasms), but are the effects of a morbid state of the bloodvessels.

3d. That they are not alone the *causes* of the tetanic spasms.

4th. That the tetanic spasms depend on *two separate causes*—firstly, on a *morbidly excitable condition of the gray substance of the cord*, induced by the hyperæmic and morbid state of its bloodvessels, propagated from the injured nerves and resulting in exudations and disintegrations of tissue; and, secondly, on *irritation* propagated and spread through the morbidly excitable cord from the same source—from the periphery, by the diseased nerves.

Mr. C. stated that the observations described in the paper were made on the spinal cords of six cases of tetanus; and that since the communication of the paper he had examined the cords of three more cases with precisely similar results. The lesions and alterations of structure, though numerous, were in some places exceedingly small, and appreciable only under glasses of considerable magnifying power.—*Lancet*, Aug. 12, 1865.

31. *Experimental and Clinical Inquiry on the Solvent Treatment of Urinary Calculi*.—Dr. W. ROBERTS, Physician to the Manchester Royal Infirmary, communicated to the Royal Medical and Chirurgical Society (March 28) a paper on this subject.

This paper is divided into two parts. The first part is devoted to experiments and observations relating to the solvent treatment of uric-acid calculi by alkalinizing the urine by internal medicines. The inquiry starts from two known data—namely: first, that uric acid is dissolved by solutions of the alkaline carbonates of a certain strength; and secondly, that alkaline carbonates can be introduced into the urine, so as to render it alkaline, by the administration of certain salts by the mouth. The practicability of dissolving renal and vesical calculi, composed of uric acid, by alkalinizing the urine, is inquired into under ten headings or sections as follows:—

Section 1. Comparison of solutions of carbonate of potash and carbonate of

soda: in which it is shown that solutions of carbonate of potash are better solvents for uric acid than solutions of carbonate of soda.

Section 2. Comparison of solutions of different strength: in which it is shown that the greatest solvent power (for uric acid) lies in solutions containing from forty to sixty grains of carbonate to the imperial pint. Above this strength dissolution is soon prevented by the formation of a crust of biurate which invests the stone. Below this strength the solvent power gradually declines.

Section 3. Comparison of the effects of varying volumes of solutions of constant strength.—It is shown that the quantity of the solution permitted to pass over the stone, between the limits necessarily imposed by the capacity of the kidneys to separate aqueous fluids, is of slight importance. A flow of three or six pints during twenty-four hours was found nearly as effective as a flow of eight or fifteen pints.

Section 4. Absolute rate of dissolution of uric-acid calculi in solutions of the alkaline carbonates.—It is shown that solutions of carbonate of potash, of the maximum solvent power, when passed at the rate of from three to eight pints in the twenty-four hours over uric-acid calculi, at the temperature of the body, dissolve from ten to twenty per cent. of the weight of the stone each day.

Section 5. The most convenient way of alkalizing the urine, the degree of alkalescence which can be communicated to it, and the doses required to produce the desired effect. The bicarbonate, acetate, and citrate of potash are found the most effective substances to alkalyze the urine. Of the three the citrate is preferred. It is found that forty grains of citrate of potash dissolved in five ounces of water, taken every two hours, alkalyze the urine to a mean degree corresponding with the maximum solvent power of solutions of carbonate of potash.

Section 7. The effect of alkalized urine on uric-acid calculi.—The urine of a person taking full doses of citrate of potash, as recommended in Section 5, is passed over a uric-acid calculus at blood-heat. The stone (weighing 180 grains) loses weight at the rate of twelve grains and a half in the twenty-four hours. In the performance of experiments on this point it came out that if the urine become ammoniacal (from decomposition of urea), it ceased to dissolve the uric acid, and the stone became invested with a crust of precipitated phosphates. Whence the important deduction is drawn, that ammoniacal decomposition of the urine in cases of vesical calculi puts an absolute bar to the effectiveness of the solvent treatment by alkaline carbonates.

Section 7. Illustration of the application of the solvent treatment in practice; first, in renal calculi, secondly, in vesical calculi.—Two cases of complete dissolution of uric-acid calculi in the bladder are quoted from other authors. The author relates three cases which occurred in his own practice. In none of the latter did complete dissolution occur. One of the cases proved to be an example of mulberry calculus; another, an alternating calculus of uric acid and oxalate of lime. This second specimen offers peculiarities of surface which indicate with certainty that dissolution of the uric acid had taken place; these peculiarities are explained by the aid of drawings of the stone after extraction. The third case proved abortive, apparently, because the treatment was not carried on sufficiently long. In neither of the cases was the treatment carried out as effectively (as the latter experience of the author showed) as it might have been. The principal instruction from the cases is, the proof they offered that alkalizing the urine does *not* cause the stone to be incrustated with a phosphatic deposit, so long as ammoniacal decomposition of the urine does not take place.

Section 8. Discrimination of the cases in which the solvent treatment is and is not applicable.—The conclusions come to are: That the solvent treatment is inapplicable in all cases where the urine is ammoniacal. When the urine is acid (before treatment) the case is *primâ facie* suitable for the alkaline solvent treatment; but exceptions must be made of cases where it is known or strongly suspected that the stone is composed of oxalate of lime, also where the stone is large. In cases where the urine is acid, and there is no indication of the nature of the stone, it may be either uric acid or oxalate of lime, or an alternating calculus composed of these two substances. Such cases deserve a trial of the solvent treatment for a limited period of a month or six weeks. The cases which

are especially suitable for the solvent treatment are those in which (the urine being preliminarily acid) it is known or strongly suspected that the stone is composed of uric acid, and has not yet reached any large size.

Section 9. Directions for carrying out the solvent treatment effectually.—The urine must be kept *continuously* alkaline, and alkaline to a mean degree, corresponding with the maximum solvent powers of solutions of carbonate of potash. The treatment must be given up immediately if the urine become ammoniacal.

Section 10. An examination of some of the objections which have been urged against the principles of the solvent treatment.

The appendix to the first part contains some experiments showing that cystine is even more amenable to the alkaline solvent treatment than uric acid.

The second part of the paper contains three sections.

Section 1 contains experiments on the solvent treatment of uric acid calculi by injections into the bladder. Solutions of the following substances were tried in a manner to imitate injections into the living bladder: bicarbonate and carbonate of potash, common phosphate of soda, basic phosphate of soda, borax, borax with liquor sodæ, potash, soap, carbonate of lithia, liquor potassæ, and liquor sodæ. The results obtained demonstrated conclusively that their operation was so slow that no practical advantage could be obtained from their use.

Section 2 records some experiments on the effects of a solution of carbonate of potash and dilute nitric acid on oxalate-of-lime calculi: neither solvent promised any useful result.

Section 3 shows the unsusceptibility of phosphatic calculi to solutions of the alkaline carbonates. Brodie's method of injecting dilute nitric acid into the bladder was imitated in one experiment, with results confirmatory of his statement respecting the use of this treatment in phosphatic concretions.—*Lancet*, April 8, 1865.

32. *Syphilization*.—Prof. W. BOECK, of Christiania, delivered at the theatre of the Meath Hospital, before the principal physicians and surgeons of Dublin, the following lecture on this subject:—

By syphilization I understand the mode of treatment by which, by repeated inoculations of syphilitic matter, taken from primary sores, I bring the body into the condition that it is no longer susceptible of the action of the syphilitic virus.

It will, perhaps, be agreeable to you, gentlemen, before I proceed further, that I should lay before you a short *résumé* of the history of this mode of treatment. Auzias-Turenne, of Paris, performed inoculations of syphilitic matter upon animals in order to see whether this virus could be transferred to them, which up to that time had been denied. In this he was at length successful, and it was chiefly apes which could with the greatest facility be inoculated. After chancres had been repeatedly produced in the same ape, a great many sceptical physicians wished to see his inoculation, and a meeting was appointed in the *Jardin des Plantes*; the old ape was inoculated, and a still greater crowd assembled a few days later to see the result. But when the ape was brought in nothing was to be seen. It may easily be imagined how the result was received, and that Auzias-Turenne was ridiculed, but he did not on that account give up the method; he continued his inoculations, found that the old ape was not susceptible of fresh inoculations, but that a second ape after inoculations got chancres, though this ape also after a series of inoculations became unsusceptible.

Auzias-Turenne now saw clearly that he had here a natural law, in itself resembling that which your immortal Jenner had discovered in the inoculation of vaccine matter, and we shall not upbraid him that his French blood now carried him away, and that his first idea was to employ the inoculation of syphilitic matter like that of vaccine matter—as a prophylactic. We cannot gainsay him that his train of ideas is logically correct, but it is not practically correct, for the great rule is, that he only gets syphilis who himself will have it.

As the result of this idea of employing syphilization as a prophylactic, my friend Auzias wished at the time to syphilize all public girls, seamen, and soldiers, and he would willingly have syphilized us all. No wonder, then, that such an idea met with all the opposition it deserved; but it was not long until Auzias

renounced his error, and at the same time there appeared an Italian, Sperino, of Turin, who showed, by a series of experiments, that the syphilitic disease was cured during these inoculations, which Auzias, too, at the same time, demonstrated. Still, this failed to reconcile physicians to the new method; such a prejudice had been raised against it that both the Académie de Médecine of Paris and the Academy of Turin condemned it without having the necessary materials before them for passing any judgment; the paradox involved in this method appeared to all so enormous as to render proofs of its absurdity unnecessary.

Lecturing in the University of Christiania upon syphilis, and having a section of the hospital devoted to this disease, I carefully investigated all that was advanced upon this subject, and ascertained that there must be some truth in it. I had, through a period of very many years, found that our treatment with mercury is highly unsatisfactory: I therefore considered that, from my position, it was my duty to give a trial to this new method, although it appeared to me as paradoxical as it did to all the world, and notwithstanding that it had been condemned by two academies. But before I began, I laid down for myself certain limits, to which I still adhere. It will be at once observed that I will not speak of the method as a prophylactic: this would be immoral; but neither am I at liberty to employ it in every case of syphilis; it is only when syphilis has become constitutional—when the syphilitic virus flows with every drop of blood through the system—that I allow myself also to inoculate it upon the skin.

The next question is, whether I shall employ syphilization in every case of constitutional syphilis?

By a fortunate coincidence it happened that of the two individuals whom I first took under treatment by syphilization, the one had not been treated for syphilis, while the other had been the subject of all the resources of our art. In the first the inoculations proceeded without difficulty, the symptoms gradually disappeared—in a word, I found myself upon the beaten path. In the other case all was irregular, I could effect no order at all, and when my first patient was well, the phenomena in the second were still in full bloom. I immediately began to suspect that it was to the medicines previously given that this result was attributable, and on subsequently investigating this opinion, its truth has been most completely confirmed; so that I have made it a general rule to syphilize only those who have not previously been treated with mercury, whether this has been employed for primary or constitutional symptoms. But if I be asked whether syphilization has not some effect in these cases, I can answer decidedly in the affirmative—it often acts incredibly. Dr. Simpson, of Edinburgh, has recently described two such cases, which were sent over to me by Professor Simpson; what is there stated corresponds precisely to what I have myself noted, and of which any one may satisfy himself. But the reason why I do not undertake the treatment of such individuals is to avoid having relapses, which in these cases are apt to occur.

Now, in order to make my usual mode of proceeding as plain as possible, I shall suppose that a person labouring under primary syphilis consults me. In this case I treat the primary sore as a simple ulcer—I prescribe a weak solution of sulphate of zinc or such like, and occasionally employ a slight cauterization with nitrate of silver; I give no internal medicine, but make the patient come to me once or twice a week, that I may observe when the constitutional symptoms break out, for the earlier syphilization can be commenced the better. So soon as I perceive the first constitutional signs, I commence the treatment by taking matter from an indurated chancre or from an artificial pustule in a patient under treatment by syphilization. I inoculate first on both sides of the chest, and make three punctures with a lancet, precisely in the mode adopted in vaccinating. After three days pustules are developed, and then I inoculate again in the sides, taking the matter from the pustules produced by the first inoculation, observing carefully to make the second inoculation at a distance from the first, so that the sores may not become confluent. At the end of three days I make the third inoculation, taking the matter from the pustules of the second inoculation; and I now continue to inoculate on both sides every third day, always taking the matter for the fresh inoculation from the pustules last formed, so long as this

matter continues to afford a positive result. When it no longer takes, I procure new matter in the same mode as for the first inoculation, and continue with this as with the first. This second matter will yield smaller sores and a shorter series than the first, and when it no longer takes I procure a third and proceed in the same manner. This third matter will produce very little effect, and I therefore pass to the upper arm, where I proceed in precisely the same mode as in the sides; and when no effect is any longer visible in the upper arm I remove to the thighs, and continue there in the same way as in the two preceding places. By the time the inoculations are here brought to an end, from three to three and a half or four months have probably elapsed, the symptoms which manifested themselves from the commencement have disappeared, or if some slight symptom has remained this disappears spontaneously. It often happens that during the treatment a fresh outbreak takes place, and he who is not acquainted with the method believes that some other plan must now be adopted; another infers that syphilization is of no avail. But, let them not be deterred by any symptom, not even by the most severe iritis, which never requires anything but the instillation of a little atropia. But, happen what may, let them shut their eyes to it and continue the inoculations. The patient who, during the whole treatment, can attend to his business, feels, after it is completed, perfectly well, and may immediately expose himself to any hardships. He can endure wet, cold—in a word, everything which after mercurial treatment would render him liable to life-long illness. It is probable that I may now be asked as to the result at a later period for these individuals, and I shall speak first of the relapses. On the whole, I have treated 429 individuals, and of these 45 have come back, making about $10\frac{1}{2}$ per cent.; but, as we may calculate that some of those treated during the last year will return, I will assume that the relapses will amount to 12 or 13 per cent. But, let us now examine more closely what is called a relapse after syphilization. In many instances a single mucous tubercle, a small white spot on the tongue or in the throat—symptoms for which nothing more than external means is employed, and for which the patients are treated only for a few days in hospital. So far as I at this moment remember, thirteen were taken again under treatment with syphilization, and two with iodide of potassium.

You will next ask whether tertiary symptoms have been developed in any of them. This has been the case, I believe, with three; but at the same time these individuals have been perfectly well—their general health has not, as so often happens after mercurial treatment, been broken down, and in those who have had relapses it has been good, as it is evident that in those who have had no relapse it has been particularly good.

We come now to the children of those who have been syphilized. Here we are not much better off than after the mercurial treatment; we see the same rule to prevail as after this last method, namely—that when the mother has been syphilitic, the first child or children is or are syphilitic; that they are healthy is the exception. If the father has been syphilitic, the children are, in general, healthy; that they are syphilitic is the exception.

You will next propose to me the question how I treat syphilitic children. I treat them precisely as I do adults; and it is interesting to see that the sores in these little ones bear in size a proportion to that of the child, and that the patients suffer less, and not more, than adults. The results of syphilization in children with hereditary syphilis have not been brilliant; of forty-two children, twenty-two died, but I have taken under treatment every case that I have met with, and every one knows that in such children there are very often affections of the internal organs which lie beyond our power to cure. I cannot at this moment say how many little children with acquired syphilis I have syphilized, but they are not few, and of these only one died, the cause of death in that instance being croup after I had performed tracheotomy. Of adults, two died—an old woman of dysentery, and a young woman of puerperal fever. This latter case I forgot to include in the *résumé* I have given in the *British Medical Journal*.

Now, in order to give you a definite idea of the confidence I have in this method after having practised it daily for thirteen years, I shall say only that if I

myself, or any of mine, were so unfortunate as to get syphilis, I should employ no other means than syphilization.

Still, a few words in conclusion, gentlemen. Vaccination has for many years stood alone; syphilization now comes to join it. Shall we stop here? I believe not. Vaccine and the syphilitic matter are both animal viruses; we see them contained under a similar law. May not also the other animal poisons be referred to a similar law? We see that nature is simple in her diversity: should this not also here be the case? Should not glanders, hydrophobia, etc., some time be curable? Let us all seek to clear up this dark point in our science, and let us not, as hitherto, with respect to syphilization, seek only to extinguish the rising gleam.—*Med. Times and Gaz.*, June 10, 1865.

33. *Syphilization*.—Mr. HENRY LEE introduced to the notice of the Royal Medical and Chirurgical Society (June 13, 1865) a patient who had been sent from this country, and who was supposed to have been cured in Norway by syphilization, under the care of Professor Boeck. Mr. Lee stated that the patient was shown, in order that the Fellows might have an opportunity of judging for themselves of the nature of the case, and of the effects of the treatment pursued. He (Mr. Lee) wished to be excused from giving any opinion upon either of these points upon the present occasion. Professor Boeck had honoured him by becoming his guest during his present short stay in this country, and he merely wished, as Dr. Boeck was unavoidably absent, to present the patient to the society in Dr. Boeck's name. He (Mr. Lee) might, however, briefly state the principles upon which Professor Boeck professed to act, and some of the physiological results at which he had arrived. Professor Boeck believes that there are two kinds of infecting sores, one of which appears as a soft chancre, and subsequently becomes indurated. This sore has no period of incubation, and is auto-inoculable. The other infecting sore has a period of incubation from two to four weeks, is not generally auto-inoculable, and secretes only thinnish pus or a serous fluid. It was with this last-named secretion that Professor Boeck, as Mr. Lee understood, carried on his process. But inasmuch as naturally the chancre last named produced no inoculable pus before the process can be commenced an inoculable secretion must be established. This is effected by constantly applying some sabine powder to the surface of the sore until an inoculable secretion is produced. This mode of artificially producing an inoculable secretion was based upon an original experiment of his (Mr. Lee's) own, in which he used sabine ointment for the same purpose. Having obtained an inoculable secretion from an indurated and naturally non-inoculable sore, Professor Boeck proceeds to make three punctures on the sides of his patient. At the expiration of three days, these points in their turn yield a puriform auto-inoculable secretion. This fresh secretion is then, in like manner, inoculated, and three fresh pustules are produced. In this way the inoculations are continued every third day, the inoculated matter being always taken from the last-formed pustules. It is found that the inoculations continually produce less and less effect, until at last no result follows. In this way a series of some twenty or twenty-five inoculations may be performed with the secretion of a naturally non-auto-inoculable indurated sore. Now, supposing that a series of twenty such inoculations had been performed, the inoculations first made would be sixty days old, and the tenth inoculations in the series would be thirty days old. If, at this time when, in the direct descent, no further effect can be produced with the inoculations last made, some of the secretion be taken from the tenth set of inoculations (thirty days old) that will be found to be inoculable again; and curiously enough, the series of inoculations from that set may be continued for the same, or very nearly the same number of times as those previously made from the same source; that is to say, if the total number of the first series of inoculations were twenty, then, if the secretion were taken from the tenth set (then thirty days old) ten more inoculations, and no more, may be produced from this source, so that the number of inoculations in the direct descent and those by collateral branches is in all cases nearly the same. When the life of this germ has been exhausted, some fresh matter is taken from another source, and the process recommenced. Fresh parts of the body—as the thighs—are then taken, and the process repeated until

no further inoculations with this kind of matter can be produced upon any part of the patient's body. Immunity from inoculation from this kind of matter, from whatever source derived, has then been arrived at, and the patient is said to be "syphilized." It is found in performing these inoculations, that when a particular series has come to an end—at the expiration, we will say, of the twentieth set of inoculations—in a patient A., and the same has occurred at the same time in another patient B., that the sores which are still suppurating on A., may, nevertheless be inoculated on B., and B.'s sores, which would no longer produce any effect on himself, may nevertheless be inoculated on A. The two series of inoculations, which have come to a natural termination on the patients themselves, may thus be crossed so as to be continued. The seed, which will no longer grow in the soil in which it has so often sown, will, nevertheless, take root in other ground, and, after it has continued there for a certain time, may be re-transferred to its original bed. Thus, in the case supposed, A.'s first series of inoculations will continue for sixty days, and B.'s series will continue for the like period. If then, some matter from one of A.'s suppurating sores (say, from fifteenth set) be inoculated upon B., they will take, and this collateral series may then be continued; and if, in like manner, the secretions from B.'s fifteenth set be inoculated upon A., the inoculations will take, and the series may be continued. After an interval, the secretions from these collateral series may again be re-transferred to A. and B. respectively. When a patient has been in this way syphilized so that no further inoculations can be produced from matter derived originally from an indurated chancre, Professor Boeck considers that he is proof against any fresh infection, and that he is cured of that which he previously had.

After these observations, the patient was, with the permission of the President, introduced to the Society, and the Fellows had an opportunity of investigating his case for themselves. On examining the patient, a small cicatrix appeared on the frænum; this was depressed. On chest and thighs were a large number of cicatrices, some of them of considerable size, depressed, and showing that there had been evident loss of substance. Very extensive destruction had taken place at the back of the throat, extending forwards through the entire length of the soft palate. The nose was depressed upon the right side, showing that there had been loss of substance either in the bone or cartilage in this situation. The upper lobe of the right lung was found to be, in part, consolidated. On the left leg was a circular cicatrix, in the course of the internal saphena vein, the remains of an issue which had been made to cure a chronic ulcer. The history which he gave was, that the ulcer on the frænum, the cicatrix of which was left, appeared in 1855; it remained open six weeks; it was very painful, and bled; it left no hardness. There was some swelling in the groin at the time, and this was treated by the external application of the nitrate of silver. The sore on the frænum appeared some six weeks or two months after he supposed he had exposed himself to contagion. About twelve months after this sore he had severe ulceration of the throat; this got better and worse several times. There was at this period some loss of hair. He never had had any eruption on the body, and had never tasted mercury. He was thirty-three years of age with a large pupil; all the family were weak in the chest." Had had ten brothers and sisters, all of whom had died of consumption. The patient, who wore a false palate, expressed himself in the strongest terms as being most grateful to Professor Boeck for having cured him of his disease.—*Med. Times, and Gaz.*, June 24, 1865.

34. *Remarks on some Recent Evidence against the Internal Administration of Mercury in Syphilis, with Cases treated by the Author.*—This is the title of a paper read before the Royal Medical and Chirurgical Society (June 27, 1865), by Dr. DRYSDALE. The author observed that as a Commission was endeavouring to arrive at some conclusion on this vexed question, he thought the present a fit time to invite discussion on the subject. He believed, in common with Mr. Syme and M. Ricord, that this disease had always existed; and that before the time of Paracelsus it was mild, probably on account of the absence of mercury from the materia medica of the ancients. Dr. Ferguson, in his letter from Evora, in 1812,

had shown what terrible mutilations were caused by mercury amongst the British; whilst the Portuguese, treated without it, had no phagedæna. M. Ricord had for some twenty years been chief of an eclectic school, which, discarding the drug in soft sores, advised "six months of treatment with a daily dose of mercury (which influences the accidents we have to combat), followed by three months of iodide of potassium. Of this treatment Mr. Syme had written that it "injures the health not less effectually than the process of poisoning it professes to have so advantageously replaced." Dr. Hughes Bennett said, "The idea that mercury is a specific for syphilis, and the incalculable mischief it has occasioned, will constitute a curious episode in the history of Medicine at some future period." Mr. Weeden Cooke and Mr. Spencer Wells said that syphilitic bone-disease did not occur without the use of mercury. The Author had recently received from Dr. Boeck, of Christiania, two works, the one entitled "*Recherches sur la Syphilis*," by Dr. Boeck; the other "*Aperçu des différentes Méthodes de Traitement employées contra la Syphilis Constitutionnelle à l'Hôpital de l'Université de Christiania*," by Dr. Bidentkap. Dr. Boeck, in his "*Recherches*," had shown that primary sores took, on an average, far longer to heal under mercury than without it (sixty-two to thirty-eight days); and also that the number of secondary appearances was far greater when it was used (twenty-four to fourteen). Dr. Bidentkap mentioned that for the last ten years there had been experiments in Christiania as to the treatment of constitutional syphilis, resulting in entirely expelling the drug. Besides syphilization—employed by Dr. Boeck, and which, Dr. Drysdale observed, had, in his opinion, for sole merit its freedom from the use of mercury—Dr. Bidentkap gave a detailed account of 192 cases treated by means of two expectant methods: (1) sweating; (2) derivation, *i. e.*, the raising of pustules by tartar-emetic ointment over the body. In these 192 cases thus expectantly treated, no worse symptoms were observed than eruptions, alopecia, sore-throat; with only five cases of iritis, which got well without mercury, and two cases of periostitis; and no bone disease. Dr. Bidentkap wrote, "The very rare cases of tertiary syphilis are met with among patients who have undergone a mercurial course elsewhere, especially abroad. Formerly, on the contrary, obstinate tertiary cases formed the majority of those treated at the hospital. It appears, then, that the exclusion of mercury from therapeutics has been the cause of it." Prof. Bärensprung, of Berlin, in his work on "*Hereditary Syphilis*" (Berlin, 1864), after enumerating mucous tubercles, sore-throat, and exanthem-like eruptions, had written: "The above rapidly described alterations are those of which, in the majority of cases, the picture of syphilis is entirely composed. These may remain for weeks or months, or vanish for a shorter or longer period, or finally disappear for life. At least, I can certify that in the now countless cases where I have treated syphilis without mercury, and which I have seen completely recover, there have never appeared any other forms than those papular and exanthematous ones, with, in a few cases, iritis, periostitis, and orchitis; but in no single instance has destructive perforation or necrosis appeared, provided that no extraordinary circumstances prevailed which have the property, like mercury, of altering the character of syphilis. . . . A rapid and well-marked mercurial cachexia is not the sole, but the most frequent cause of phagedæna. . . . Tertiary syphilis is not mercurial cachexia: it is syphilis in a constitution modified by mercury." Dr. Drysdale observed that his own experience completely corroborated the remarks of Bidentkap and Bärensprung. He gave the details of several cases recently treated by him without mercury, with immunity from any but trifling lesions. In conclusion, Dr. Drysdale said he believed that syphilis in adults was not always, but almost always, a very mild disease, when treated without mercury; that rupia was extremely rare when no mercury was used; that bone-disease did not occur unless in mercurially treated cases; and that, in short, the internal administration of mercury in syphilis, or in inflammatory diseases, had neither any rational theory to appeal to, nor was it supported by the experience invoked in its defence. He trusted that the verdict of the Profession would soon be against the internal use of mercury in syphilis,—*Med. Times & Gaz.*, July 29, 1865.

35. *Acupressure*.—Dr. WILLIAM PIRRIE, Professor of Surgery in the University of Aberdeen, has published (*Med. Times and Gazette*, July 1 and 8, 1865) a very interesting paper on this subject, in which he briefly describes the principal methods of acupressure, seven in number, and gives his experience of this hæmostatic agent.

The *first method* consists in passing a needle through the flaps or sides of the wound, so as to cross over and compress the mouth of the bleeding artery or its tube, just in the same way as in fastening a flower in the lapelle of our coat, we cross over and compress the stalk of it with the pin which fixes it, and with this view push the pin twice through the lapelle. The only portion of the needle which is left exposed internally on the fresh surface of the wound is the middle portion of it, which bridges over and compresses the arterial tube at its bleeding mouth, or a line or two or more on the cardiac side of it. And if it were a matter of any moment, this part need not always be left bare, for the needle could often be passed a few lines higher up, between the vessel and the cut surface, and without emerging on that surface, more or less of both extremities of the needle, viz., its head and point, are exposed externally on the cutaneous surface of the side or flap of the wound.

The *second method* consists in entering the needle on one side of the artery, pushing it behind, causing its point to emerge on the opposite side of the vessel, passing a loop of inelastic iron wire over its point, bringing the wire over the track of the artery and behind the stem of the eye end of the needle, drawing it sufficiently to close the vessel, and fixing it by a twist or half a twist around the needle. The wire with which the needle is threaded should be twisted that it may be readily distinguished. By means of this twisted wire the needle can be pulled out, after which the loop of wire is liberated, and can be easily withdrawn.

The *fourth method*, or that by a long pin, and a loop of passive iron wire, is a modification of the third, and differs from it only in a long pin, with a glass head, for facilitating its insertion, being substituted for the common sewing needle threaded with iron wire. Perhaps of all methods the third and fourth are the most secure. The principle in each of these is the same, but Prof. Pirrie says he likes the modification of using long pins when convenient from the form of the wound, as they can be so quickly introduced, so readily withdrawn, and all wriggling and entanglement of different kinds of wires with each other avoided.

The *fifth method*, or that by the twist, may be varied according to the extent of rotation of the needle, whether to a half or quarter rotation. The operator has, on the cessation of bleeding, a reliable proof that a sufficient degree of rotation has been given to the needle. This method may be practised with a long pin or with a threaded sewing needle, and with either it can be very quickly done; but of all methods of acupressure that by the twist with a long pin is the quickest.

In acupressure by the twist to the extent of a half rotation of the needle, the three first movements given to the needle are precisely the same as in the third method, above described, namely, it is entered on one side, pushed behind the artery, and its point is made to emerge on the opposite side. The needle is then twisted over the artery and fixed on the parts beyond. In this method the artery is to a certain degree both twisted and compressed. Prof. Pirrie says the first time he tried the method by the twist, a half rotation was given to the needle: but so little pressure when direct is sufficient to arrest hemorrhage; in other cases a quarter rotation was only made by it.

The *sixth method*, or that by *transfixion and twist*, consists, as hitherto tried, in transfixing the tube of the artery, causing the point of the needle to emerge on the surface of the wound, giving a quarter rotation to the needle and fixing its point in the tissues beyond the vessel.

The *seventh method* consists in passing a long needle through the cutaneous surface, pretty deep into the soft parts, at some distance from the vessel to be acupressed, making it emerge near the vessel, bridging over and compressing the artery, and dipping the needle into the soft parts on the opposite side of the vessel and bringing out the point of the needle a second time through the com-

mon integument. In this method the soft parts are twice transfixed, and the artery is compressed between the bone and the middle portion of the needle without the integument, between the first point of exit and the second point of entrance. Three portions of the needle are left without the integument, namely, its central portion and its extremities.

Prof. Pirrie gives a brief account of thirteen cases in which he employed acupressure. These cases he tabulates also as follows, to show the conditions for which acupressure was used, the method employed, and the age of the patient:—

No.	Operation.	Age.	Method.
1	Amputation of thigh . . .	6	Third method.
2	Do.	13	Fifth, or twist, half rotation.
3	Do.	51	“ quarter rotation.
4	Do.	66	Fourth method.
5	Do.	14	Third method.
6	Do.	15	Fourth method.
7	Excision of mamma . . .	42	First and third method.
8	Do.	35	Third method.
9	Excision of elbow-joint . .	22	Third method.
10	“ testicle	21	First method.
11	Amputation of leg	28	Fifth method, quarter rotation.
12	Wound	22	Seventh method.
13	Excision of mamma . . .	47	First and third method.

In forming an appreciation of this proceeding Prof. Pirrie says: “The first great point to be determined is, whether or not acupressure is a perfectly reliable method of checking surgical hemorrhage. That it is so, my belief is as strong as it could well be on any surgical point; and I have a decided impression that any surgeon who gives it a fair trial will assuredly arrive at the same conclusion.

“Besides being as reliable as any hæmostatic yet employed, it appears to me to have the advantages of being the quickest, the easiest of application, and the safest means yet devised for arresting bleeding. That the vessels in a large amputation can be acupressed in a much shorter time than they can be ligatured I am perfectly satisfied, and in cases where every drop of blood is precious, it seems to me that to do all that can be done to preserve life, as far as saving of blood has influence, it is the duty of the surgeon in all suitable operations to give his patient the benefit of this new proceeding. But shortening the period occupied in arresting hemorrhage is not only important for diminishing one of the early dangers of an operation—namely, that from loss of blood, but also for lessening the risk of the more remote dangers from suppuration, and many distressing results of the higher grades of the inflammatory process in the stump. I have long thought we are too apt to forget that living tissues are resentful of even slight injuries, and that we are not sufficiently careful to use the sponge as seldom, and as gently as possible. Whatever shortens the period of hemorrhage must diminish the risk from frequent touching of the parts.

“That acupressure can be applied with the greatest facility and ease, any surgeon may satisfy himself by giving it a trial. For arriving at a just appreciation of acupressure, one of the most important points to be determined is, the effect of its use on the frequency of pyæmia, which is admitted by all to hold a high place among the causes of death after great operations. It is only by the careful observation and record of a long series of cases that this question can be definitely determined. It will, however, be generally admitted that whatever promotes primary union diminishes, and that which induces suppuration increases, the tendency to pyæmia. Primary union never does or can take place throughout the whole of a wound where the arteries have been ligatured; but where they have been acupressed that desirable result is often obtained, and the risk of the occurrence of pyæmia entirely obviated. Whatever be the alterations that take place in the blood in pyæmia, and whether the morbid matters

are absorbed, imbibed, or generated in the blood passing through an unhealthy inflamed tissue, there can be no doubt that, for the occurrence of pyæmia, inflammation of, or having a tendency to assume, a suppurative character, is absolutely necessary. The presence of purulent, irritating, and decomposing materials, and more or less of devitalized tissue at every point of deligation, renders it highly probable that the risk of pyæmia is much greater after ligature than after acupressure, which does not so readily give rise to these untoward local results. Acupressure requires a far briefer sojourn of the foreign body in the wound; the obliterating foreign body is safer and less irritating, because it is of a metallic and not of a textile nature; and the acupressure needle does not cause that mechanical division and strangulation of the arterial coats which is the inevitable result of the application of the ligature.

"I considered it a duty to give acupressure a fair trial. I wished to form an unprejudiced judgment regarding it, and the conclusion at which I have arrived is, that it has many and great advantages over the ligature. I have therefore resolved, in all suitable cases, to give it the preference."

Prof. P. regards the application of the ligature, by Ambrose Paré, to arrest hemorrhage, as the greatest single improvement in surgery, and he says, "We cannot bid adieu to the ligature, because there are some conditions in which acupressure cannot be used, as there are others in which it is impossible to employ the ligature; but, while many great operations have such a high rate of mortality in the practice of *all* good surgeons in *all* countries, it seems a duty not 'to rest and be thankful,' but to receive, and gratefully to adopt, acupressure, in the hope that some of the sources of danger may be modified or entirely removed."

36. *Acupressure*.—Dr. P. H. WATSON, Lecturer on Surgery and Surgeon to the Royal Infirmary and Chalmers' Hospital, Edinburgh, has published (*Ed. Med. Jour.*, July, 1865) an interesting paper on this subject, in which he relates nine cases where he has employed this hæmostatic measure, and discusses the questions—1st, as to its safety; 2d, its utility and application as contrasted with ligature and other hæmostatics; 3d, the prospect it affords of expediting the process of healing by the first intention.

The following are his conclusions:—

1. Acupressure may be employed as a hæmostatic agency in the instance of vessels as large as the posterior tibials without risk, so far as bleeding, immediate, consecutive, or secondary, is concerned.

2. Acupressure is easy of application, while its adaptation to situation and circumstances is as great, or it may even be greater than that of the ligature.

3. Acupressure is more trustworthy and satisfactory than either torsion, compression, or the use of the cautery.

4. Where primary union can take place, acupressure is likely to favour its occurrence; and, in three of the cases described, seemed of material service in this respect.

5. In the cases described, where suppuration or sloughing occurred, this was altogether independent of the use of acupressure, or the absence of the employment of the ligature, and referable to causes inherent in the individual cases.

6. In my opinion, the employment of acupressure in one or other of the methods suggested by Professor Simpson is safe, satisfactory, and well worthy of an extended trial.

37. *Carotid Aneurism perfectly cured by Starvation, Rest, and Iodide of Potassium*.—Dr. S. C. SEWALL reports (*Canada Medical Journal*, Oct. 1864) an interesting case of this. [In the following description, L. T. signifies lower triangle, or the space bounded by the clavicle, trapezium, and sterno-mastoid muscles. U. T., upper triangle, is the space bounded by the sterno-mastoid, the trachea, and inferior edge of lower jaw.]

On 9th March, 1864, M. D., hewer. æt. 24, having just returned from the shanties, applied to me for tumour on the neck that interfered with his breathing,

and complained of the annoyance caused by the pulsation. Examination of the right side of the neck revealed a diffuse swelling occupying the whole of the L. T., and the U. T. as high as the hyoid bone. On applying the hand, strong pulsation with aneurismal thrill was manifest. The stethoscope revealed an impulse like that of an enlarged and hypertrophied heart; and the cordal sounds were louder than over the region of the heart itself. The swellings could be made to disappear by pressure. There was no hesitation in arriving at the diagnosis that this was sacculated aneurism of the whole of the common carotid, also that it was incapable of cure by operation. Before the discovery of the coagulating properties of iodide of potassium, or little more than two years ago, I could only have let my patient die. Having some thirty-three or thirty-four years ago seen at La Charité, in Paris, the beneficial effects of starvation and rest in retarding the progress of a case of aortic aneurism, I determined to conjoin these with iodide of potassium internally. I enjoined absolute rest in bed, allowed eight ounces of *white* bread and one pint of water per diem, and ordered five grains of iodide of potassium in an ounce of water three times a day. Now, for the progress of the case, which I saw at intervals of three days; and I would draw especial attention to the rapidity of the improvement, and the total disappearance of the aneurism. In three days, on the 12th, the swellings had perceptibly subsided, and the dyspnoea was much relieved; the history of that in the U. T. may be disposed of in a few words: it subsided gradually and uniformly for fifteen days, at the end of which time no aneurism could be distinguished. The rest of my remarks apply to that in the L. T.; on the 18th, from being a diffuse, shapeless swelling, it had contracted to the size of a large hen's egg, dipping under the sterno-mastoid muscle, much firmer, impulse and sounds diminished. 24th. Reduced to the size of a walnut. April 1st. Size of a pigeon's egg. 6th. Size of a large hazel-nut. 21st. All trace of aneurism gone. It is worthy of notice, that the aneurism regularly diminished from above downwards, and without inwards, so that when it was reduced to the size of a hazel-nut, the finger had to be pushed under the cloidal insertion of the sterno-mastoid and close to the clavicle in order to feel it. I have no doubt that there were two sacculi, one filling the U. T., the other and the larger the L. T.

On the 1st April, the diet was increased to 12 oz. bread, half pint milk, and a pint of water. 6th April, allowed to get up. 21st. Released from all restraint as to diet or exercise. He was directed to continue the iodide of potassium for two months longer as a precaution. I next saw him on the 15th May, when he had recruited his strength very much, and left for home. I heard of him up to 25th August; he wrote that there was no sign of the disease returning. I am firmly of the opinion, that had not scant diet and absolute rest been conjoined with the iodide of potassium, no such successful result, as now detailed, would have been obtained. It would be a great satisfaction to me to hear of the same plan being pursued in cases of aneurism in other parts, *e. g.*, popliteal aneurism, when the application of a starch-bandage would insure perfect rest to the limb, not omitting, however, the recumbent posture. Of course, there was considerable loss of weight, but the emaciation was confined almost entirely to the muscles. Before taking to bed the patient's muscles were hard and salient; but at the end of three weeks, when the diet was first increased, the limbs were round and soft like a woman's, but not much diminished in size, and the skin had the waxy watery appearance of oligemia. The explanation seems to be this: the temperature of the room, according to French Canadian custom, being always 78° or 80°, there was little call on the lungs to keep up the animal temperature; absolute rest being enforced, a minimum of aerated blood was required by the muscles, so that the lungs required a very small quantity of fuel, which was almost all supplied by the starch of the bread, thus very little fat was required. We know that under starvation, or a deficient supply of food, the azotized and phosphorized materials of the blood disappear very rapidly, and the waste can be made up only from the muscles.

The selection of white bread instead of brown, was made expressly because it is so much less nutritious to the blood, containing only a fractional portion of phosphorus, which is found almost entirely in the bran.

38. *Idiopathic Aneurism of the Distal End of the Ulnar Artery Successfully Treated by Compression.*—Mr. HAYNES WALTON publishes (*Med. Times & Gaz.*, Aug. 12, 1865) the following case to illustrate the therapeutic value of compression, and also as it completes the evidences of the general applicability of this measure, whenever it may be resorted to. "It would be impossible," he remarks, "to find an example of aneurism better fitted, in all respects, than this seemed for the treatment by ligature, because of the size of the vessel, the superficial position, the relation of parts, and the nature of the collateral circulation; but, withal, there remained still the peculiar risks incidental to an operation on a bloodvessel, and common to all surgical operations, for, unfortunately, there is not a diminution in the risk in proportion to the lesser size of a wound; therefore I did not hesitate, but at once resolved on trying pressure."

"On December 2d of last year, a student in the St. Mary's Medical School, aged 21, discovered a pulsating tumour over the ulnar artery, an inch from the wrist, and applied to me; he could find no cause for it. I made a careful examination, and satisfied myself that there was before me an undoubted instance of ulnar aneurism; it was about the size of a horse-bean."

"It is needless to go into detail. Suffice it to say, I applied a cork compress with strapping-plaster on the tumour, and over about three-quarters of an inch of the proximal portion of the artery. I took this off a few times, and immediately re-applied it, as occasion seemed to require. The arm was kept in a sling."

"Although the aneurismal pulsation was reducing, I thought it right to discontinue this kind of compression, because the hand swelled, and in a fortnight I changed it for a little spring clamp. This appliance, like the other, was kept on perpetually, only shifted a little higher or lower occasionally to afford relief. In a fortnight more—that is, a month from the commencement of the treatment—the aneurismal sac was less in size, and contained a clot. Only a feeble circulation could be felt in it, and a less than natural impulse on the vessel beyond the sac. The force of the artery entering the sac was also less. The sling was now laid aside, and the hand and arm used moderately. Three weeks later there was no pulsation in the sac, which was much smaller, the clot being much less. Neither was there pulsation on the distal side, and but very faint movement in the artery within half an inch of the sac."

"The clamp was now taken off occasionally—that is, sometimes during the night, sometimes during the day."

"At the present time (July 20), nearly eight months having passed away, there is not the slightest evidence in pulsation or clot of the aneurism. The only difference to be found in the arm is the absence of pulsation of the ulnar artery in the spot where the aneurism was formed and beyond it."

"That a better result could be got, with less injury from treatment or even inconvenience, I think very unlikely. I am fully satisfied, and so is my patient. I am well aware that the compression may have been applied somewhat differently and the details otherwise managed; but this really matters not in such instances if principle be kept in view and the processes by which the cure is to be established are obtained."

39. *Operation of Trephining for Spinal Fracture.*—Dr. R. McDONNELL brought before the Pathological Society of Dublin a highly interesting case of this. The subject of it was a thin, spare man, admitted into Jarvis Street Hospital, December 28, 1864. "A short time before," Dr. McD. states, "while working in the hold of a vessel, from which a cargo of wheat was being discharged, a sack of corn had fallen upon him from a height of seventeen or eighteen feet. The weight fell upon the back of his head, neck, and shoulders; he sank beneath it, and to use his own expression, was 'doubled up.' Immediately after the injury his lower limbs were powerless; he was at once conveyed to hospital, where I happened to be at the moment of his admission; I had, in consequence, an opportunity of examining his spine at the seat of injury before any tumefaction had occurred. I found that the spinous process of a vertebra, corresponding with either the first lumbar or the last dorsal, was more prominent than natural, while a marked depression, leaving no doubt whatever as to the

existence of displacement between the vertebræ, was to be felt in the place of the spinous process of the vertebra above. When a circle was made round the body, on the level of the umbilicus, with a piece of cord, the prominent spinous process was found to be exactly four inches above the circle; it was accordingly fixed as the spinous process of the first lumbar vertebra. The lower limbs were paralyzed, as were also the bladder and rectum. The urine drawn off by catheter was not bloody."

At a consultation Dr. McD. strongly urged an operation, but his colleagues objected. The loss of power of motion and feeling subsequently became more marked than just after the injury; the urine dribbled away; the feces were passed involuntarily; on the ninth day the urine was neutral; on the eleventh alkaline, and containing copious muco-purulent deposit; a few days later it became bloody, and of a most offensive odour. Although placed on a water bed, and attended to most carefully, bed-sores formed; the penis became ulcerated, and the scrotum œdematous, and of great size. He suffered from thirst, flatulence, and pains over the bladder.

On the 30th of January, Dr. Brown-Séquard happening to arrive in Dublin, saw the patient, and expressed the opinion that trephining offered a chance for life. The following was the patient's condition: Pulse 100, regular, but feeble; tongue clean, rather dry; had rested tolerably well the previous night; no headache; complaining of flatulence, and has a tendency to diarrhœa; bladder completely paralyzed; urine constantly dribbling away; no urine accumulates in the bladder; he is absolutely unconscious of the discharges passing per anum; and fluid feces ooze incessantly from the rectum; the penis is swelled, and the prepuce ulcerated from constant contact with the urine; there is an ulcer as large as a sixpence at the root of the penis, in the fold between the penis and scrotum, and the whole scrotum is swelled, red, and superficially excoriated; back, over the sacrum, ulcerated to a considerable extent, but, except in one small part, not deeply; at this one part matter can be pressed out, showing that the ulceration extends to some depth under the skin. Upon the inner ankle of left foot, and the outer ankle of the right two smaller spots (dry and scabbed) exist, where ulceration has occurred apparently without pressure of any kind having taken place. Paralysis of motion is almost complete in both lower limbs; in this respect they are exactly alike. On doing his best to produce a movement in the legs, a slight motion is perceived in each groin; the muscles of the thigh, and of the calf, and of the toes, are motionless; no reflex movement can be excited; sensation is normal along the thighs, over the skin of the calf and shin; rubbing or pressing on the sole of the foot is not perceived; he can, as regards the thigh and calf, distinguish the compass points at the usual distance, as in persons who feel normally; he can tell what part of the thigh or calf is touched by the hand, and in these parts distinguish, with precision, heat and cold, and also pricking with a point. There is no difference in these respects between one limb and the other; in each foot sensibility is much impaired, and the sole of each is devoid of feeling altogether.

On the 3d of February Dr. McDonnell operated in the presence of Dr. Séquard and many surgeons of Dublin.

"The patient was not removed from the ward or from the bed on which he lay. This was in order, as far as possible, to avoid disturbing any callus which might possibly have already formed. He was put under the influence of chloroform as he lay on his back in his accustomed position; when chloroformed, the bed was carried opposite to the window. The patient was turned over on his face; in this position the seat of the injury was obvious from the prominence of the last two (?) dorsal vertebræ. A small spot of ulceration, not so large as a sixpence, existed over the most prominent spinous process at this part.

"An incision nearly five inches long was made with a strong scalpel over the spinous processes of the vertebræ (the two last dorsal and two first lumbar), with a strong curved bistoury, the slips of tendon on each side of the spines were divided. Keeping quite close to the bone the mass of muscle was detached on each side, and securely held apart by broad retractors well suited for the purpose. The spinous processes and laminae—in fact, the back of each vertebra as far out as the articulating process, was thus fairly and fully exposed. The

spine of each exposed vertebra was then taken hold of in a strong pair of necrosis forceps, and cautiously but firmly shaken to try whether any fracture of the posterior arch, or of the processes could be detected. No such fracture existed. [This I expected, as I had reason to suppose from the nature of the injury, that if any fracture existed it was one of the body of the vertebræ.]

"On examination I was satisfied of the displacement existing in the parts with which I had to do; it was as follows: The last dorsal vertebra (?) was as it were twisted, so on the left side the inferior articulating process was raised up, and although not completely dislocated, yet it stood prominently backward from the corresponding process on the bone below; on the right side the superior articulating process of the same vertebra was in exactly the opposite predicament; it was displaced so as to be as if pushed in deeper with the process to which it corresponded on the vertebra above.

"I determined to remove the spinous and inferior articulating processes of this vertebra by cutting through the laminae. After waiting for a time while sponges and cold water were applied to stop bleeding, I first took off a part of the spinous process of the part I was going to remove, and divided the interspinous ligaments above and below. I next, with a straight pair of bone forceps, cut through the lamina on the patient's left side (on which side I stood myself). This, owing to the displacement I have already described, was quite easily effected, as, of course, the lamina, as well as the articulating process, was raised up somewhat on this side. On the right side, however, the opposite state of things made it much more difficult to succeed in cutting through the lamina. I could not succeed at first with the cutting forceps, but was obliged to use Hey's saw guarded, so that it could not go in beyond a certain depth.

"I was unwilling to use the saw, lest the unavoidable shaking might injure the callus already thrown out, and tend to undo any repair that nature had already commenced.

"I finally succeeded in dividing the lamina on the right side with the forceps, I then grasped, in a pair of necrosis forceps, the root of the spinous process of the portion now separated, and raising it cautiously, divided, with a scalpel, the ligamentous structures which now alone prevented its removal. On sponging away the blood, the theca vertebralis came into view; a small portion of the arch of the vertebra above was also removed. The spinal cord was obviously pushed backwards, and had lain very close under the arch of the bone taken away. The vertebral theca was not tense; there was no evidence of either blood clot or fluid being pent up within it; it was, therefore, not opened, although I had at first intended to do so, knowing very well that there is no real danger in this proceeding.

"Slight venous hemorrhage took place from the veins underneath the bone.

"The operation lasted about an hour; it was protracted by long rests now and then, waiting until the sponging with cold water and infusing of matico checked oozing of venous blood, as it was necessary to see with great precision what one was doing. I do not think that more than five, or at the most six, ounces of blood were lost. A couple of sutures were put in at the upper part of the wound; the lower part was left open, a small tent of soft sponge alone being introduced.

"After the operation the patient was replaced on his back, pads of spongipiline being placed above and below the wound, and the sacrum protected by a circular cushion. He lay on a water bed, nearly flat, the head but slightly raised, and a cushion being passed behind the knees. He got an opiate enema; while being arranged a jet of urine was thrown from the orifice of the urethra; of this he was not conscious.

"The same evening he commenced taking the 96th of a grain of atropia in solution, to be continued three times a day.

"The bladder and the large intestine were carefully washed by injections of tepid water and thin flaxseed tea.

"February 4th; day after the operation; pulse 120, regular but weak; had rested tolerably, sleeping for a couple of hours at a time, some headache, and heat of head and skin; tongue dry, but not coated. When about to wash out the bladder, the urine was observed to come in a jet from the orifice of the ure-

thra; bowels had not acted since the previous day, the opiate enema having checked the diarrhœa; the pupil was not affected; the atropia, as yet, was continued in the same dose as before. The penis and scrotum diminished in size, and the superficial ulceration much better. In the afternoon, Dr. Brown-Séquard accompanied me to see him; we then found that sensibility had returned in the soles of the feet, and that a decided return of motor power had taken place in the muscles of the thigh. Complains of cough, which hurts him—in fact, he had caught cold from the exposure during the operation. Ordered iodid. potassii three grains, in decoct. cinchonæ flavæ, along with the atropia.

“5th. Pulse 108. Skin warm, but natural; tongue moist; had rested tolerably; no headache; appetite returning; had an egg for breakfast, and asked for a mutton chop for dinner; cough much less troublesome. Dr. Brown-Séquard again this day examined him along with me; we observed some œdema of the left leg and foot; sensibility is now almost, if not quite, normal all over the foot and sole. The sartorius, hamstring, and quadriceps extensor femoris are able to contract with considerable strength; we can perceive no sign of movement in the muscles of the calf, or in the toes; their motor power is still absolutely wanting. The most improvement has taken place in the state of the penis and scrotum.”

After this he continued for several days to progress satisfactorily. On the 7th of Feb., sensation was found to be normal everywhere; and the motor power of the muscles of the thigh had much increased. On the 17th the expulsive power of the bladder was restored. Afterwards he had a rigor with sickness of stomach.

“19th. Pulse 125, very weak. Felt very weak to-day when being dressed. Bowels moved; discharge thin, and indicating diarrhœa; sickness continuing, not checked by ice, hydrocyanic acid, &c. Bladder has been washed daily with the turpentine emulsion as before. I believe the condition of the bladder to be certainly improved, and the voluntary power over it so likewise. He says he did not sleep at all last night, but does not know what kept him awake, as he had no pain.

“He died rather suddenly on the morning of the 20th, having been seen by the resident pupil about an hour before, and reproved for smoking, which he had been found doing by the night nurse. He was then apparently quite himself, and not in pain.

“Post-mortem examination made the same day (20th) in presence of the pupils. Body much wasted; no œdema.

“*Head.*—Considerable subarachnoid effusion, also some clean serum in each lateral ventricle; brain and its membranes healthy.

“*Chest.*—Lungs healthy, indeed remarkably so; no old adhesions; heart normal; no fluid in pericardium.

“*Abdomen.*—Stomach and intestines healthy; no lodgment in any part of the bowels; no ulceration in the rectum or the parts of the large intestine.

“Urinary bladder contracted to a small size, greatly thickened, and containing small collections of pus in its walls. Mucous membrane ulcerated, and covered with ash-coloured shreds of adherent membrane; both ureters thickened, so as to be as thick as the little finger; the mucous membrane lining each was in the same condition as that of the bladder, and on the left side this extended all the way up to the kidney, the pelvis of which contained pus; its structure was disorganized by abscesses.

“On examining the bodies of the vertebræ on their anterior aspect there was no inequality which made it obvious where the injury had taken place. The lumbar and lower dorsal vertebræ were removed; the spinal cord and its membranes were taken by cutting through the laminae of the dorsal vertebræ. The dura mater of the cord was uninjured; the portion of it corresponding to the piece of bone removed at the time of the operation was covered externally with lymph; the surface next the cord was healthy; there was no trace of inflammation within the dura mater. The cord was not inflamed or softened; it was indented at a point corresponding to where the bone was displaced; and when the finger was passed along it gently it felt as if softened at this indentation, but there was neither red nor white softening of its structure, and this feeling was

merely the result of pressure, which had not given rise to structural disorganization.

"The body of the first lumbar vertebra was fractured, and this vertebra was displaced backwards; the line of fracture separated only a small portion of the body of the broken vertebra. The intervertebral substance between the last dorsal and first lumbar vertebræ had been torn, and the body of the first lumbar was displaced backwards, as shown in the preparation exhibited. A small blood clot occupied the space above the projecting body of this vertebra, lying between the body of last dorsal vertebra and the anterior aspect of the dura mater of the cord. The spinal cord was therefore pushed backwards by this effused blood, as well as the body of first lumbar vertebra—not simply by the sharp ridge of bone, as might be at first supposed from looking at the woodcut. It was, of course, corresponding with this part that the indentation existed upon the spinal marrow."

Dr. McDonnell observed, in conclusion, "that the autopsy showed at all events that the diagnosis arrived at in this case was accurately correct, not only as to the position of the fracture, but as to the injury of the vertebral theca and medulla, which was not supposed to be torn or divided. He regretted that the posterior arch of the last dorsal vertebra had not been removed entirely, as this would have added nothing to the danger and little to the difficulty of the operation. The amelioration which followed the operation in this case, he considered the best reply to those who argue that, as the body causes in general the pressure, and as the body of the vertebræ cannot be reached by operation, no good can follow from trephining the spine. It is certain that in this case good did follow the removal of the counter-pressure. Some persons supposed that the operation of trephining the spine was of so hopeless, and, at the same time, so formidable a nature, that to perform it was merely to strew thorns in the path of the man who was on his way to the grave. He did not think so, and he could affirm with truth that this patient did not, at all events, suffer *more* after the operation than before it. On the contrary, the history of the case shows that in several respects his condition was ameliorated; and he pointed to other recorded cases to show that his life was *not* materially shortened, or shortened at all, by the operation."

40. *Osteoplasty*. By Dr. KADE.—The word osteoplasty was first used by Pirogoff to denote his modification of Syme's amputation at the ankle-joint; and it was afterwards used for a class of operations similar in principle, in which cut surfaces of bone were opposed and made to unite, such as resection of the elbow and of the knee. Langenbeck, however, employed the word in a different sense, to denote his first case of rhinoplasty with transplantation of the frontal pericranium, and afterwards for two cases of "osteoplastic" resection of the upper jaw, and for his first case of uranoplasty. Hence the meaning of the word has become obscure. It is evident that there is nothing truly osteoplastic about Pirogoff's amputation, or about resection of the knee, or in separating portions of the upper jaw, and replacing them after the removal of a tumour. For the future, the term osteoplasty should be applied only to operations in which periosteum is transplanted for the purpose of producing new bone, as in the nose and palate cases mentioned above.

After tracing down the history of our knowledge of the power of periosteum to produce bone, and after referring to the experiments of Flourens, Dr. Kade describes the more recent ones of Ollier. He detached strips of periosteum from the tibiæ of rabbits, leaving them adherent to the bone at one end only, and wound them about among the muscles and under the skin in various directions: thus obtaining new bone of any desired shape. In a second series of experiments he completely severed the connection between the strip and the bone on the fourth day; and, in a third, he severed this connection in the first instance, and transplanted the periosteum to various parts of the body. In all cases a formation of bone was the result; not a mere calcification of connecting tissue, but a formation, possessing all the characteristics of osseous structure.

The first application of this property of the periosteum to operative surgery

is due to Langenbeck; although the suggestion so to use it was made by Ollier. Malgaigne in 1834 advocated the preservation of the periosteum in resections, on the ground that in children it formed a basis for new bone, and in adults for fibrous tissue; and Sexton, Sen., in 1839, preserved the periosteum of a partially carious rib with full knowledge of the results to be obtained from doing so. Since then the same thing has been done by many surgeons; but the transplantation of periosteum is manifestly a step in advance of its mere preservation.

The results hitherto obtained from osteoplastic operations have been very satisfactory. Langenbeck has recorded two cases of rhinoplasty; in the first of which firm new bone was formed in four weeks, and in the second in eight. Dr. Kade saw him operate on a third case, and saw the patient again six weeks afterwards. The operation had been very difficult and tedious; and the point of the new nose had sloughed. At that time no bone could be discovered in the bridge.

On the hard palate the results have been more favourable; and Dr. Kade refers to eleven cases of uranoplasty by Langenbeck, and to one case of his own, performed in January, 1862, in which he fully describes the several stages of the operation. The patient was a peasant lad seventeen years old, with congenital fissure of the lip, hard palate, and velum, on the left side. The staphyloplasty and uranoplasty were both accomplished at one sitting.

The first step of the operation was to pare the edges of the fissure. In doing this the knife was carried from behind forwards and from below upwards, so that parts still uncut were not obscured by bleeding. In consequence of the scanty development of the velum it was impracticable to remove its margin in a continuous strip; and the paring was done piecemeal, and with some difficulty. The fissure of the palate itself was pared more easily, and the operator found it most convenient to stand behind the patient, supporting his head upon his breast. The same position served for the lateral incisions and for the separation of the periosteum. After paring the fissure the author proceeded to make his lateral incisions; thus departing from the practice of Langenbeck, whose second step is the section of the muscles of the velum. Dr. Kade defends his own practice partly because he thus proceeds continuously with what can be done from behind the patient, and chiefly because the myotomy is attended with acute pain and free bleeding, and requires a long interruption of the operation. In the case under consideration, the cleft of the hard palate being unilateral and not very wide, and the palate process of the superior maxilla not too small, it was sufficient to make a single lateral incision, on the side on which the palatine process was not united to the vomer. The third step, the separation of the muco-periosteal covering of the palate, should be commenced on the right side from the margin of the cleft, on the left side from the side of the teeth. When the muco-periosteal covering has been separated by an elevator as far back as the posterior margin of the palate plate of the palate bone, the mucous membrane of the velum must next be separated from this margin. For this purpose a straight probe-pointed knife should be carried along the margin from within outwards, as far as the hamular process. In raising the periosteum, it is necessary to be very careful to avoid the incisive foramen and the posterior palatine foramen, which give passage to the nutrient vessels. It is easy to avoid the naso-palatine artery, which passes through the incisive canal, since the fissure is usually small anteriorly; and no very extensive separation of periosteum is there required. In experiments on the dead subject, the author found the anterior palatine artery, which passes through the posterior palatine foramen, always uninjured, even although he separated the periosteum with but little care. He thinks, moreover, from the very free anastomosis upon the palate, that the vitality of the flaps would not be endangered, so long as one of the nutrient vessels remained intact. The fourth step is the introduction of the sutures, which can be done more easily while the velum is tense than when it has been relaxed by myotomy. The author used nine sutures, five in the palate and four in the velum. As each thread was passed, he stuck together its free ends by a bit of wax, and gave them in charge to an assistant. The fifth step was the myotomy, for which a sickle-shaped knife was thrust through the velum, below and somewhat external to the hamular process, towards the posterior

wall of the pharynx, and the velum was then divided in its whole thickness, by sawing movements of the knife, up to the posterior margin of the palate bone. It is desirable to divide the levator and circumflexus palati at a distance from the median line, where they are small, and prior to their fan-like expansion; but it is an error to suppose, with Langenbeck, that the palato-pharyngeus can be divided by the same incision. The author thinks that Langenbeck's incision is insufficient to relax the velum; and that the palato-pharyngeus or posterior pillar, and the palato-glossus or anterior pillar, require to be separately divided. He neglected to do this, and the fissure of the velum did not unite after his first operation, but only after a second, in which the pillars were cut through. After the myotomy the patient requires a period of rest; and then the operation is completed by tying the sutures.

In the author's case the fissure of the palate was perfectly closed, and the second (successful) staphyloraphy was performed a month after the first. In March the hare-lip was united, and healed by the first intention; and, at the end of the same month, a needle discovered new bone in the place of the former cleft of the hard palate. The speech was still defective, the patient being stupid, and having neglected to carry out the necessary vocal gymnastics.—*Half-Yearly Abstract*, vol. xli., from *Schmidt's Jahrb.*, 1864.

41. *Rhinoplasty, from the Forehead, the Periosteum included in the Flap.*—Dr. GEO. BUCHANAN, Surgeon to the Glasgow Royal Infirmary relates (*Lancet*, Aug. 5, 1865) a case of this.

Dr. B. remarks: "It has long been known that bone is in great part dependent on the periosteum for its vascular supply, and that the removal of this membrane to any great extent is usually followed by partial necrosis and exfoliation. Of late years, however, it has been found that the periosteum may be separated from the bone to a limited degree without danger of necrosis, and that in the transplanted tissue a deposit of bone readily takes place. Advantage has been taken of this knowledge by many practical surgeons, especially on the Continent, foremost among whom must be named Professor Langenbeck. After a visit to Berlin, where I had the advantage of seeing that celebrated surgeon perform the operation for renewing the hard palate, I determined to try osteoplasty in the first case which afforded an opportunity.

"I have not met with a case of cleft-palate since, but the success of some of Langenbeck's operations is most encouraging. I saw several in which the gap was completely filled up. One in particular I remember, where, with the patient's permission, I pushed a needle against the new palate, and found that its point impinged against solid bone, which was formed in the transplanted periosteum.

"In the following case I applied the principle to the formation of a new nose. I did so with confidence, because it had been done with success by Langenbeck and others, and I had no fear of exfoliation of the cranial bones. Some months previous to this time I had under my charge several cases in which large portions of the cranial bones had been completely denuded of periosteum, and in most the recovery of the bone was complete, granulations having sprung up all over the surface. Besides it is to be remembered that the *cranium is very freely supplied with blood from within*, so that there is little risk of exfoliation unless the bone itself is injured. Acting on this knowledge, I had no hesitation in stripping the frontal bone of part of its periosteum, and the result of the case showed it can be done with perfect safety.

"Jane S., aged twenty-four, was admitted to the Royal Infirmary February 25, 1863. Three years previously she was a patient in this hospital with lupus affecting the nose. The disease was arrested after three months' residence. On admission it was found that the whole organ, from the nasal bones downwards, had been destroyed by the disease, but the edges were completely cicatrized, and there was no appearance of a return in any other part. She had employed an artificial substitute, but it was so inconvenient and troublesome that she had long discontinued its use, and was anxious to have the deformity remedied. I accordingly yielded to her request to have the operation performed, and accomplished it in the following way:—

"The patient having been put under the influence of chloroform, I cut away the stump of the nose, and thus left a free bleeding edge around the anterior osseous margin of the nares. I then formed a flap, the shape of a leaf, on the forehead, the part corresponding to the footstalk reaching to the roots of the hair. The upper half of the flap I dissected from the pericranium, and then cut deeply and firmly down to the bone. The lower half of the flap I detached with a blunt instrument, tearing the periosteum from the bone, and leaving the latter completely bare. No vessels required ligature. I then twisted the narrow part of the flap, where it remained attached to the root of the nose, and found I could easily apply its edges to the raw margin of the stump. Two silver wire sutures were inserted on each side, and in the intervals sutures of horse-hair. The footstalk was made to form a columna, and was attached by a wire suture.

"Next day the parts were a little swollen, but warm and healthy.

"On the fifth day it was found that the horsehair sutures had caused a little ulceration, and they were removed. The wire sutures were retained, having caused no irritation. On the eighth day, the incisions having united, all the sutures were removed. Three weeks after the first operation the twisted neck was cut across, formed into a needle shape, and inserted into a depression cut into the integument over the bridge of the nose, and fastened by a silver suture. It healed by the first intention.

"The wound in the forehead was dressed with lint soaked in water. Granulations soon sprang up and covered the whole surface of the bone, and cicatrization rapidly took place.

"She was dismissed on the 13th of June, remarkably improved in appearance, and with a very fair nasal organ. The upper part of the nose was decidedly firmer and more solid than in a former case in which I performed rhinoplasty successfully, but I cannot affirm that bone had been deposited at the date of dismissal.

"Some time after leaving the hospital I learned that she was seized with disease of the kidneys and anasarca, of which she died. But the operative procedure was attended with such success that I shall have no scruples in adopting the same method in other cases which may come under my charge."

42. *A Second Series of Fifty Cases of Ovariectomy*.—Mr. T. SPENCER WELLS communicated to the Royal Medical and Chirurgical Society (June 27,) a table showing at a glance the result of the fifty operations; the recoveries being to the deaths in the proportion of two to one. The most favourable age for the operation appears to be before twenty-five or above forty. The conjugal conditions of the patients seem to have little effect on the result. Hospital cases have been more successful than private cases. The result of the operation depends but little on the season of the year in which it is performed. Adhesions of the tumour to the abdominal wall and intestines are of little importance; adhesions to the bladder, iliac vessels, ureters, or rectum are very unfavourable. A short pedicle is also very unfavourable. There is no doubt that the cases where the stump of the pedicle can be kept external to the peritoneum are much more uniformly successful than those in which the stump is allowed to sink into the abdominal cavity. Of this latter class of cases the least unfavourable are those in which the ends of the ligatures are cut off short. The size of an ovarian tumour does not of itself affect the result; but size and solidity together, by affecting the length of the incision necessary for the removal, appear to be of some importance. A short incision is much more favourable than a long one. The probable result of ovariectomy can be estimated with far greater accuracy by a knowledge of the general condition of the patient than by the size and condition of the tumour.—*Med. Times & Gaz.*, July 29, 1865.

43. *Laceration of the Internal Lateral Ligament of the Knee-joint*.—Mr. W. B. PEEBLES relates (*The Medical Press*, July 5, 1865) the following interesting case of this rare accident:—

"In May, 1859, I was sent for to visit a gentleman, aged 32, who in stepping from a stone, used for mooring boats to, sprained his left knee and fell helplessly to the ground. I found the limb slightly flexed, the toe everted, and some swell-

ing accompanied with pain over the site of the internal lateral ligament. On asking him if anything similar had occurred before, he said that ten years previously, when riding through a rabbit warren, the horse stepped into a hole and fell with him; that his left leg was held between the body of the horse and the ground in a state of eversion; that swelling and pain in the joint resulted; and that antiphlogistic treatment was adopted; but that no flexion or extension, as recommended by Hey for the internal derangement of the knee-joint, was resorted to. Subsequently the joint had received several twists.

"After the swelling and pain had been removed by means of leeches, cold lotions, and rest, the joint was strengthened by sea-water douches, iodine, and bandages. In the following shooting season he was able to walk for seven hours on level ground; but upon going on hilly ground the limb at once felt weak.

"In the following November, I was suddenly summoned to him again. He had been walking down a steep incline overhanging the sea, with a gun in his hand, when the joint 'gave' under him, and he rolled down till stopped by a bush. He might have remained there for an indefinite period, as the place was secluded, had not some people come within call. On this occasion the limb presented the former symptoms in a more marked degree. There was much eversion of the foot, a considerable amount of pain, and effusion into the bursa which lies over the ligament. On pressing with the tip of the finger deeply at this point, an interval could be felt between the femur and tibia. I told him that I was of opinion that the ligament had been torn across, and that after antiphlogistic treatment the limb should be kept in an immovable apparatus. I applied a starch bandage strengthened by layers of pasteboard, leaving an opening for leeching, &c., and recommended a laced knee-cap to be worn constantly in bed as well as when moving about after it was removed. Six months after he went to Professor Fergusson, who, he told me, said that the limb had the signs resulting from Hey's displacement, 'but that there had been something else.' What he considered that to have been I believe he did not state. He recommended an elastic knee-cap and chloroform liniment. This opinion, coming from so high an authority, shows that the two accidents are closely allied, but they differ in some respects.

"I do not mean to say that the cartilage may not have been out of its place and have slipped into it again, but there were points which made me believe that such had not been the case. For instance, the joint had been made to assume the appearance of 'in-knee' suddenly and violently (subluxation), but the patient was able to bring it into the slightly flexed position in which it lay when I first saw it. It was not, as Miller says, 'immediately rendered stiff,' nor was the accident produced as Hey's is said generally to be—viz., 'When a person in walking strikes his toe, with the foot everted, against any projection, after which he immediately feels severe sickening pain in the knee, and is unable to straighten the limb.'—(Sir A. Cooper.)

"On each occasion the ligament was subjected to sudden direct violence, and the pain (sickening at first) referred to its centre. It is probable that on the first occasion complete rupture took place, followed by lengthened union (the foot remaining everted); that on the second the ligament was only violently sprained (I could not sink the tip of my finger between the bones), and that on the third, complete rupture took place.

"The symptoms of this injury differed from those of Hey's derangement in the greater amount of motion (passive, of course, on account of the pain), which the joint was capable of, the small spot to which the pain was referred, the inconsiderable amount of swelling, and the mode of its occurrence. There is much obscurity still as to the true nature of the 'internal derangement;' but from the position, direction, and connections of the internal lateral ligament, from the eversion of the foot when it is injured, and from the permanence of the eversion after Hey's lesion, it is probable that it never escapes being more or less injured when the relative positions of the cartilage or condyle are suddenly altered, and that the closer the union which it is so desirable to bring about between the torn fibres is, the less liability there will be to recurrence of the accident. Hence the necessity of handling the joint as gently as possible, and of keeping it at perfect rest for a long time after the injury.

"The treatment recommended by Sir C. Bell for this laceration is a stiff splint at first and then a jointed one. Locally, leeches followed by a succession of blisters. To this I would add, when walking is resumed, a boot with the sole increased in thickness on the inner edge. This occurred to me in consequence of my patient when walking on the slope of a hill finding it easiest to walk across the slope with the injured limb the lower one, the weight being thus thrown on the outer edge of the foot. The reason of this appeared to be that it tended to throw the limb into the perpendicular and ease the ligament. If a jointed splint should be objected to, a laced knee-cap fortified with straps and buckles should be used, and great caution in every movement observed. In bed especially the knee-cap will be necessary.

"As recurrence of the accident in a greater or lesser degree may be looked upon almost as a certainty, it is worth considering whether incomplete ankylosis might not be advisable for those whose avocations place them in positions not otherwise dangerous."

44. *A Sixpence lodged in the Larynx during Ten Weeks.*—Dr. J. B. SANDERSON and Mr. J. W. HULKE related to the Royal Medical and Chirurgical Society the following case of this:—

On November 2d, the patient was conversing in a public house, having a sixpence in his mouth, when something in the conversation having excited his laughter the sixpence disappeared, and immediately he fell to the ground suffocated. For about an hour there was excessive dyspnoea, which, however, subsequently disappeared so completely that on the following day he experienced no bad effect from the accident, excepting that he was unable to speak aloud, and had slight dysphagia. During the succeeding ten weeks he lost flesh and strength, but experienced no difficulty of breathing, either on exertion or otherwise; the voice remained as at first. On January 6th, his breathing again became embarrassed. After lasting for some hours the dyspnoea suddenly ceased, apparently in consequence of his having tripped in going down stairs. On the following day he attended at Middlesex Hospital for laryngoscopic examination. The sixpence was seen without difficulty on the first introduction of the laryngeal mirror. It was horizontally placed in the glottis, below the false vocal cords, which covered a portion of its circumference at each side, being in such a position that a transversely oblong breathing space was left between its free edge and the arytenoid cartilages. Several attempts having been made without success to extract the coin through the upper opening of the larynx, by means of loops of wire specially contrived for the purpose, it was resolved to have recourse to laryngo-tracheotomy. An incision an inch and a half long was made in the middle line from the thyroid cartilage downwards, the edges of which were held apart above and below with two pairs of Trousseau's dilators. The coin could be readily felt by forceps introduced through the wound. Several attempts were made to seize it, in one of which it was displaced upwards into the patient's mouth. At that instant the patient made a sudden gulp, the coin slipped out of reach, and the patient, who had become conscious, made signs that he had swallowed it; it was recovered on the following day. After the operation the patient progressed so favourably that he was able to leave the hospital on January 18th, feeling no effect from the accident, excepting that the voice was still husky and feeble. By February 20th it had regained its natural character.

Dr. Webster referred to several cases on record, and especially to the well-known case of the celebrated engineer. He adverted to a case which occurred in his own practice, in which a cherry-stone remained in the bronchus sixty-eight days, and was then expelled by coughing. Louis relates a case in which a small gold coin remained four years in the trachea, and Dupuytren one in which a coin remained ten years. John Stevenson, an old Covenanter, had a bit of mutton bone the size of half a hazel-nut in his trachea fourteen years and nine months, and then coughed it up, and got well. M. Sue met with the case of a girl who had had a piece of chicken bone in her bronchus seventeen years. She coughed it up and got well. Dr. Webster then asked the opinion of the surgeons present as to the advisability of opening the trachea in such cases.

Mr. Thomas Smith begged to be allowed to add to the various means for dislodging foreign bodies from the larynx that had been mentioned, one other expedient, namely, that of drawing through the larynx from below a small piece of sponge attached to a piece of silk. This plan he had adopted successfully in a case of laryngeal obstruction after tracheotomy, where a small tent of sea-tangle weed had escaped into the cavity of the larynx, and had become lodged there. The thread in this case was passed on a probe through the tracheal wound and larynx into the mouth, and the sponge being tied to the opposite end, and traction made, the foreign body presented itself in the mouth. The advantage of tracheotomy in these cases was obvious. If the foreign body were in the larynx, it allowed air to enter the chest freely, so as to give the full expulsive effect to coughing when the tracheal wound was for a moment closed: by means of it the surgeon could, without danger to the patient's life, make attempts to dislodge the foreign body from below; while if the foreign body were in the trachea or bronchus, a large tracheal opening gave the best chance of escape. He related two cases—the one under Mr. Skey's care, the other under Mr. Paget's, at St. Bartholomew's—where a plum-stone in one case, and a tamarind stone in another, were shot out from the wound by a strong expiratory effort within a few minutes after the performance of tracheotomy. He believed that attempts to seize movable foreign bodies in the trachea by means of forceps were quite useless, while he could bear testimony to the value of Mr. Birkett's advice, that if attempts were made from below to push foreign bodies out of the larynx, a good-sized elastic catheter should be used, and not a silver probe.—*Med. Times and Gaz.*, June 24, 1865.

OPHTHALMOLOGY.

45. *Orthopedic Method of Curing Certain Cases of Strabismus.* By EMILE JAVAL.—This paper was read before the Heidelberg Ophthalmological Congress, and we are indebted for the following translation of it to the *Ophthalmic Review* (July, 1865).

"Permit me to lay before you the general outlines of an orthopedic method of curing certain cases of strabismus by evoking and exercising the patient's binocular vision. The method consists partly in an application of the stereoscope. To attain our object with the least possible expenditure of labour and time, the exercises which I propose must be performed, according to circumstances, either before or after tenotomy. They often suffice to effect a cure without any operation.

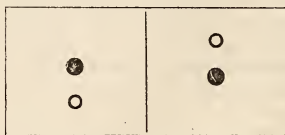
"The series of exercises I have proposed are intended to break the patient of his habit of converging or diverging the deviated eye, and, what is more difficult, of suppressing its retinal images. In most cases the patient is, above all, directed to always keep one eye, especially the sound one, covered. Every one will doubtless concede the utility of separately exercising the amblyopic eye, keeping the sound one closed. But, besides this, we must combat the habit the squinting eye has acquired, of suppressing its retinal images, by keeping it always closed when the sound eye is used.

"It will facilitate the matter to confine myself in the present description to the case of a monolateral convergent squint.

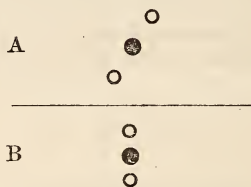
"The first day you give the patient a slide with two marks on it, one for each field of the stereoscope: one black, larger mark is presented to the amblyopic; a smaller coloured one to the sound eye. At first the smaller mark is the only one generally seen; but when the sound eye is closed or covered, the larger mark comes into view. If the sound eye is now cautiously opened, the patient may succeed after a few trials to see both marks at once. If this does not soon take place, I give the patient the card with him, and after a little practice at home, he the next day perceives the two marks with the greatest ease.

"If there exist an antipathy to single vision, which does not very often occur, it may be combated by a method which I have described in another place

(*Annales d'Oculistique*). I now determine the distance two points must be placed from one another, in order that the patient may be able to combine them in the stereoscope. In the sound eye this is $6-7\frac{1}{2}$ centimetres; let it be in our case 3 centimetres; I give the patient a series of slides, marked with two dots, 3, $3\frac{1}{2}$, 4 . . . 12 centimetres apart. These dots are black wafers, having a diameter of 2 centimetres. Above the one and below the other, smaller red wafers are fixed, which the patient must always see, in order to feel assured that, when he only sees *one* black dot, he is really seeing with both eyes, and not perhaps suppressing the image in the squinting eye.



"This disposition of the red dots has the further advantage of teaching the patient to see them vertical, as in B, and not sloping, as in A, which he does first. He soon learns this, and may proceed to the next slide—



"If it is desirable to extend the exercises destined to combat undue convergence, all that is necessary is to use the same slides in a stereoscope deprived of its prisms and convex lenses. The exercises are thus rendered more difficult, and hence more effectual.

"If, on the other hand, the case is one of short sight, with divergent squint, the exercises are commenced with a stereoscope without glasses, and finished with one with glasses.

"If the divergence or convergence has been driven up to the limits of the field of the stereoscope, the exercises can be extended without its aid by means to be mentioned at a future time.

"Long before the patient has gone through all these exercises, I make him combine letters, then words, first larger-typed, gradually smaller-typed ones, placed 7 centimetres apart, just as he did the wafers.

"Of course, there are a variety of minor practical points to be attended to to effect our object rapidly.

"The following exercise consists in presenting in a stereoscope to the two eyes two pages of perfectly similar print, gradually taking less and less sized type. The patient endeavours to simultaneously perceive the right and left hand, out of which strokes certain letters are formed, the right-hand ones being perceived by the right, the left-hand ones by the left eye.

"This and the previous exercises, which I direct some to perform, also with a stereoscope without glasses, *i. e.*, letting them accommodate for a near point with parallel visual axes, so break the patient of converging when he wishes to accommodate and from suppressing one retinal image, that at one time, when he uncovers the one eye, he sees everything double about him.

"When he has got thus far, the patient can sometimes at once combine the double images: in such a case the strabismus is cured. In other cases the patient has to be taught to move his eyes in the ordinary way, *i. e.*, to be able to make the optic axes intersect at any one object. Sometimes, to teach him to do this, is the most difficult part of the treatment.

"To guard against relapses in regarding even the smallest objects, I employ the following common experiment. If you hold your finger between you and

the object you are looking at, the finger appears double, but does not conceal any part of the object. Of course, this only occurs in binocular vision. The patient is accordingly directed never to read without holding a pencil between himself and the book; if the pencil appears double, and conceals no part of the reading, you may be certain the patient is using both his eyes. He soon learns to read in this way; and later, at his last visit, I give him glasses according to his ametropia, they, as Donders has so conclusively proved, removing the primary cause of the evil and the fear of its recurrence.

"The reason I give the patient glasses at so late a period of the treatment is, because I wish to make him do something much more difficult—compelling him, as long as he is under my supervision, to see binocularly without the aid of glasses—than he will have to do afterwards, when he has glasses. Of the sixteen cases I have had the opportunity of seeing, tenotomy had been practised, once or oftener, without bringing binocular vision into play. I have had cases of alternating squint with hypermetropia, of monolateral converging squint with amblyopia, which having admitted of vision of No. 20 of Jäger, of myopia with insufficiency of the internal recti, of hypermetropia in the one eye with myopia and amblyopia in the other; and only twice has the result been really negative. In one case paralysis existed; in another diplopia, with strong divergence, the result of an overdone operation; and even in this last case a marked improvement ensued. In the left half of the field of vision the exercises enabled the patient to combine the double images, and the case was completely cured by replacing the rectus internus forward by a thread operation."

46. *Amaurosis and Deafness of Smokers and Drinkers.*—M. SICHEL, in continuation of a former communication published in 1863, observes that among the forms of cerebral amaurosis there are two which, although little known, are not of infrequent occurrence, and are difficult of cure. One of these, produced by the abuse of alcoholic drinks, he describes as long ago as 1837, under the designation of "amaurosis symptomatic of delirium tremens;" and the other, produced by the abuse of smoking, was first described by Mackenzie. Incredible as to this last, when first announced, M. Sichel, in the course of twenty-eight years' practice, has frequently met with it, and he believes that there are few persons who can smoke for any long period more than five drachms of tobacco daily, without their vision, and often their memory, becoming affected. In both these forms of amaurosis there is wellnigh absence of all well-marked cerebral congestion, and there is a vagueness in their sthenic or asthenic characters, which may cause hesitation and perplexity on the part of the surgeon, if unaware of the cause in operation. The ophthalmoscopic appearances, as in most old cerebral amauroses, are negative or ill-marked. The optic papillæ, sometimes very white, especially in one of their halves, sometimes slightly injected, have their contours ill-circumscribed or in part effaced. The retina is but little injected, the central vessels being sometimes normal and sometimes enlarged, the central veins being especially so when the affection has reached its last stage. All the characters observed are, in fact, in common with those of other cerebral amauroses. As in many of these, too, the memory is often enfeebled; and in the amaurosis from alcohol there are frequently trembling of the hands in the morning, and at a later period morning vomiting. Both of these varieties are very slow in their progress towards cure, and very refractory to treatment. Usually observed separately, they may be seen together, and in such cases it is not easy to decide whether the tobacco or the alcohol plays the chief part. The treatment of these cases usually occupies a long time, and an essential point, of course, is the discontinuance of the practice that has given rise to the amblyopia or amaurosis. In the few cases in which there is any marked congestion present, this must be met by antiphlogistics; but when this is not very positive, bleeding must only be resorted to with the greatest care. As in all forms of passive or old cerebro-ocular congestion, liberal depletion, even by leeching or cupping, and still more even moderate bleeding, soon completes the loss of vision, and this is only slowly and incompletely restored. On the other hand, external and internal stimulants, such as liniments, flying blisters, camphor, strychnia, &c., resorted to before a moderate antiphlogistic and deri-

vative treatment has been put into force, only aggravate the disease. When there is but little congestion, mild aperients are very useful, such as equal parts of cream of tartar and magnesia, alternating with pills of gum ammoniac, sulphate of potass, and aloes. In drinkers these means will not be borne, and minute doses of rhubarb and magnesia may be substituted. Cold water should be applied to the forehead and eyes, while the lower extremities are irritated by sinapisms, dry cupping, &c. At a later period are indicated stimulant liniments to the circumorbital region, flying blisters first to the nape, or behind the ears, and then to the temples; and in very obstinate cases, the various internal stimuli, as camphor, arnica, strychnia, &c., may be tried.

M. Triquet states that in smokers and drinkers an insidious and obstinate form of otitis frequently becomes developed. There is a kind of numbness or torpor of the ear, with a sense of cold, but rarely any pain. There is no cerumen in the meatus, the membrane and ossicula are in a normal state, and there is little or no vascularity. There is, however, extreme dryness with very minute granulations of the pharynx, nasal fossæ, tubes, and middle ear. Frequently both ears are affected, but one has always commenced being so before, and is more deaf than the other. The deafness, without being very troublesome at first, rapidly increases. Noises in the ear almost always exist at an early period, and it is of importance to notice that they assume a hissing sound. The affection exhibits itself in three periods: 1, that of excitement, in which there is intolerance of noise, and a hissing noise in the ear; 2, that of depression, in which the hissing sound disappears, or only remains as a distant and feeble echo; and 3, that of a paralytic condition of the auditory nerve, in which the sense of hearing is more or less completely, and often permanently lost. In this period there are also often trembling of the tongue, embarrassment of speech, and disturbance of vision. The prognosis is very unfavourable, for those patients alone are susceptible of cure who will consent to leave off the bad habit which has produced the affection. For treatment, in the early stages cupping of the mastoid processes and drastic purgatives, and then alteratives, as calomel, sulphur, and small doses of arsenic, are indicated. Locally stimulating fumigations, and weak injections of strychnia or veratria have proved useful; electricity has always done harm.—*British & Foreign Med.-Chir. Rev.*, July, 1865, from *Annales d'Oculistique*, March, 1865.

47. *Foreign Body lodged in the Anterior Chamber for Twelve Years successfully extracted.*—Dr. SAMISCH relates (*Klin. Monatsbl. für. Augenh.*, 1865) the following case:—

A man, aged 31, applied on the 25th November on account of an inflammation of his right eye. He stated that it had been injured twelve years previously whilst breaking stones; he himself treated the consequent inflammation by the application of cold. In a few weeks he recovered with the exception that the vision remained much impaired. So he continued till three weeks ago, when, without apparent cause, the eye became red and soon afterwards painful. On examination a cicatrix was seen in the cornea; the aqueous humour was turbid; immediately below the pupil there was a blackish body, pyramidal in shape, and surrounded by a light-grayish covering; in the pupillary space there were some remains of a cataract; atropia acted slowly and imperfectly. The foreign body was extracted and a large piece of iris was at the same time excised. The after-treatment consisted of the use of the compressing bandage and of atropia. Already by the third day the pupil was dilated *ad maximum*, the aqueous humour had become clear, and the congestion of the subconjunctival vessels had much diminished. The patient was discharged on the 16th December; he could then count figures at the distance of a few feet, and the eye was free from irritation. The foreign body was a fragment of stone 5 mm. long and $2\frac{1}{2}$ mm. thick.—*Ophthalmic Review*, July, 1865.

48. *Ointment of the Yellow Amorphous Oxide of Mercury in Conjunctivitis and Phlyctenular Ophthalmia.*—Dr. PAGENSTECHER recommends this ointment as possessing an almost specific action in the treatment of phlyctenular ophthalmia. He gives the following short sketch of the disease in order to indi-

cate in what forms and under what conditions he recommends the use of this ointment:—

“I consider conjunctivitis and corneitis phlyctenulosa, which have been called by different authors by the most different names, according to the views they took of their causes, as a purely local disease of the conjunctiva and cornea, as one and the same condition, which becomes modified secondarily by the constitution of the patient. The anatomical, typically characteristic form consists in vesicles, or pustules, on a basis of infiltrated tissue of the ocular conjunctiva; they are developed mostly near the cornea at the limbus conjunctivæ, or, from the very commencement, on the cornea itself. These vesicles soon pass, as the epithelium gets destroyed, into raw surfaces, the surrounding infiltrations becoming removed, a loss of substance in the form of an ulcer thus ensuing. The morbid action varies extremely in its intensity; so does the extent of surface denuded of its epithelium; but a greater or less development of vessels is always observed as a concomitant phenomenon. The mode of arrangement of the vessels around the vesicle is somewhat peculiar: the vessels are all directed centripetally towards the vesicle. If the vesicle is on the ocular conjunctiva, the vessels run uniformly from all sides towards it as a centre; but if the vesicle is at the edge of, or on the cornea itself, the vessels also run to it from the adjacent parts of the conjunctiva; and thus aggregations of highly hyperæmic vessels are seen, which often rise above the level of the conjunctiva, whilst the rest of the conjunctiva exhibits comparatively few signs of irritation. If, on the other hand, the vesicles are developed more or less over the whole ocular conjunctiva, this latter may assume a more general redness. This may also occur if the vesicles form over the entire edge or surface of the cornea. As a rule, the formation of vesicles is limited to the cornea only, when the conjunctiva had been previously affected. The dependence on and relation to the conjunctival disease of any given purely corneal vesicle is perceived in the higher degree of redness and vascularity of the corresponding part of the conjunctiva; a pointed triangular leash of vessels running beneath the corneal epithelium very often forms the connection between the vessels of the conjunctiva. As the vascularity gradually invades the greater part of the corneal surface, we get the form of disease described by authors as corneitis vasculosa, scrofulous pannus, pannus phlyctenulosus. We very often see the disease represented by one single vesicle on the cornea, which runs the usual course, *i. e.*, passes into an open ulcer, as the epithelium, separated by the fluid in the vesicle, gets detached, after the vesicle has, as above remarked, become connected by a narrow leash of vessels with those of the conjunctiva. At the border of the ulcer next the edge of the cornea a fresh turbid swelling of the cornea ensues, and this, as it advances towards the centre, is continuously followed by the bundle of vessels, constituting one of the most obstinate corneal diseases, known as corneitis fasciculosa. These anatomical phases may, under certain circumstances, undergo further changes, either from local irritation, want of cleanliness, wrong treatment, or from constitutional predispositions, such as the lymphatic or scrofulous crasis.

“Or from a continuance of such unfavourable circumstances, ulcers, at first of very limited extent, appear to spread in area, or even invade the deeper layers of the cornea, when we have to contend with corneitis ulcerosa, or corneitis profunda—forms to which the ointment is often inapplicable.

“In the above briefly indicated forms of corneitis, every practitioner will, I presume, agree with me in recognizing one and the same type of disease that acquires its special form from the different kinds of irritation or structures in which it has originated. In all these forms I assert the yellow oxide of mercury ointment is a certain and almost specific remedy.

“The good effect of the ointment is most displayed in the more chronic cases, after the originally greatly increased irritation of the cornea has somewhat abated, and the vascularization appears under the form of what is generally known as passive congestion. If the disease is in a more acute stage, the ointment may be applied from the very commencement, if care is taken to completely remove it from the conjunctival sac, as some may, from the spasm of the lids which is associated with the photophobia, get retained in the folds of

the mucous membrane. The disease may possess the peculiarity of the phlyctenulæ recurring. Fresh phlyctenulæ then form near the ulcers, always giving rise to increased irritation. Our attention is attracted by increased intolerance of light, lachrymation, and ciliary neurosis; an accurate examination then generally reveals small abscesses or phlyctenulæ. As soon as the abscess has, by breaking through the epithelial layer, discharged its contents, the previous state of quiescence at once returns. These intercurrent attacks must not deter us from continuing the application of the ointment; for it rather accelerates, than otherwise, the course of the disease. Only when the base of the ulcer is extending deeper than Bowman's layer, into the cornea substance proper, must we exercise caution in using the ointment, and only try it in the first instance as a matter of experiment. If we, from the too long continuance of the stage of reaction, gather that the ointment irritates too much, we must wait for a day or two before trying it again. In such cases it is as well to employ also remedies of known sedative effect, such as atropia, a compress-bandage at night, warm fomentations of 35° R. for a few hours. It may also happen that superficial ulcerations of the cornea under unfavourable circumstances pass into purulent corneitis; purulent infiltrations in the layers of the cornea or hypopyon form, and, of course, here to apply the ointment is out of the question. Only after the purulent corneitis has passed into the reparative stage, may we again try the ointment, and may be surprised at the rapid regeneration of the corneal substance that ensues. The ointment is also an excellent means of clearing the cornea in all those exudations which persist after inflammations, especially in those cases in which the insufflation of calomel has hitherto been employed. I can further recommend it in mild cases of scleritis, limited to the superficial layers of the sclera (episcleritis) unaccompanied by any marks of irritation in the iris. In all the above forms of disease we may convince ourselves that the ointment acts favourably, more or less rapidly, and in but few cases is it necessary to employ any constitutional treatment in addition to the local. Purges are, as a rule, of no use, and cannot be recommended, for the reason that all weakening of the constitution must be avoided. Derivations through the skin, counter-irritants, blisters, act, according to my experience, injuriously rather than favourably on the eye-disease.

"The frequent occurrence of conjunctivitis phlyctenulosa along with diseases of the skin, eczema, crusta lactea, lupus, and generally in persons with a very irritable skin, explains the above fact sufficiently, as the effect of this remedy is not counter-irritant or derivant, but the very reverse—to increase the already existing irritation. The patients require a more strengthening and tonic treatment, as they have often been already too long kept for weeks in dark rooms, and prevented enjoying the fresh air. We order, therefore, above all, a good nutritious diet, going out into the fresh air, careful attention to the skin by cleanliness, cold water, and friction. These must be especially attended to. They materially assist the local treatment. If children suffer from great intolerance of light, giving rise to a nearly constant spasm of the orbicularis, I have often seen quite surprising results from suddenly dipping their faces in cold water, as recommended by von Gräfe."

"The contra-indications of the ointment may be briefly enumerated, as they are easily self-comprehensible. As regards the other inflammations of the cornea, no good effect can be observed from the yellow oxide of mercury. Corneitis purulenta, blennorrhoea, or corneitis vasculosa, originating in granular lids and trachomatous pannus, generally get worse under it. In syphilitic corneitis parenchymatosa it has no effect one way or the other; but in the consequent obscurations of the cornea the ointment may be used, after all acute symptoms have completely vanished, to clear the cornea. If any iritis coexists, the ointment must be studiously avoided, as well as in all deep infiltrations and ulcerations of the cornea. I have often asked myself on what physiological fact the good effect of the yellow oxide of mercury depends; but must confess my inability to satisfactorily answer this question. Its immediate effect is undoubtedly irritant; for any previous vascularity is at once heightened on its

¹ I fully confirm the efficacy of this treatment.—J. Z. L.

application. The immediately increased flow of tears and disagreeable feeling of pain in the conjunctival sac, which are not perfectly explicable by its action as a foreign body, prove there is no necessity for the application remaining any length of time on the diseased parts to produce its effects. When the ointment is applied for the first time, the irritation may persist for several hours, till it gradually sinks to its previous degree, some easily coagulating mucus being at the same time secreted from the conjunctiva; a certain feeling of comfort even often ensues, which is attributable to the diminution of the extreme photophobia. On the second or third application, always observing an interval of four-and-twenty hours between each, the immediate irritant effect is already much less in degree and continuance than on the first. The eye gradually so accustoms itself to it that generally after it has been used for a week the re-action only lasts from a quarter to half an hour. It is principally the intolerance of light that markedly decreases, and *pari passu* the flow of tears. The mucous membranes lose their turgescence, partly by the vessels becoming diminished in calibre, partly by their disappearing altogether, and partly, also, by absorption going on in the swollen tissue itself, the mucous membrane acquiring a more dry appearance. The raw exudation surfaces, whether on the conjunctiva or cornea, lose their rough appearance; their yellowish colour gets more grayish-white; at last they become quite smooth; if they were deep in the substance of the cornea, they get more raised at their edges, and clear up. On the site of the previous ulcers a fascetted surface may remain for some time; that, however, as the corneal substance becomes regenerated, becomes smooth and covered with epithelium. This process agrees perfectly with the ordinary course of the healing of these ulcers; it is the rapidity with which we observe the regeneration and repair to take place under the use of the ointment that surprises us. As regards the photophobia, we possess in the yellow oxide of mercury an excellent sedative, due, it is true, to the previous brief irritation, just as we explain the similar action of nitrate of silver in catarrhal ophthalmia. Red precipitate has been long known as a particularly excellent application in indolent ulcers. The red precipitate in many cases irritates too much; but the yellow oxide of mercury, probably from its fine state of division, agrees better with the more delicate structures of the eye, and only excites that slight amount of irritation which is necessary to exert an alterative action on the diseased tissue, and on the, perhaps exposed, nerves.

"I must, finally, call attention to a very important matter, namely, the method of applying the ointment, as its results depend in great measure on this. The ointment is to be applied only once a day; best with a small brush, which is dipped in the ointment and applied between the eyelids; these, by their closure, rub off the ointment from the brush. If the ointment is properly made, *i. e.*, has the right consistence, it gets, by the movements of the lids, diffused over the whole conjunctiva and cornea, and then soon, by the same agency, extruded from the eye. It is best then to wipe it off with a piece of linen, lest it, by remaining too long in contact, create any undue irritation. If the movements of the lids are insufficient to completely remove it from the conjunctiva, we may try to effect this by gently rubbing the closed lids, and afterwards raising both the upper and lower lids from the surface of the globe.

"Any ointment that still remains becomes then very quickly washed out by the tears. If the ointment is not well made, *i. e.*, if it does not melt at once on its application to the conjunctiva, some may remain in the reflection from the lids, and give rise to serious signs of irritation, from an extensive slough forming, and, as a consequence, a partial separation of the mucous membrane. It is, therefore, as well to inspect the conjunctiva again a few minutes after applying the ointment. On this account the ointment is better suited for patients on whom the surgeon is in a position of watching its immediate action."—*Ophthalmic Review*, July, 1865.

[The mode of preparing this ointment will be found described at page 507 of this No.]

MIDWIFERY.

49. *Facilitation of the First Stage of Labour.*—Dr. ANDREW INGLIS maintains (*Ed. Med. Journ.*, July, 1865) that the most efficient means hitherto proposed for facilitating the first stage of labour, is to separate the membranes for some distance round the os. He calls attention to the effect on the character of labour of such a separation. He states: "In the first stage of labour coming on and proceeding without interference, there are two opposite conditions of the passages—one in which there is a copious discharge of viscid mucus, and which is often called a 'wet labour;' and another, in which there is hardly any, and labour is called 'dry.' At the full time, the first seems to occur normally in the cow, mare, bitch, etc., and, I am inclined to believe, is natural also in the human female. I consider the following as being the natural process in women: The ovum having become ripe, the membranes separate from the cervical portion of the uterus, if not from the whole surface. They then by their weight press more heavily against the cervix, even when the patient is lying down; and as the pressure is soft, equable, and continuous, the cervix gradually yields to it and becomes quite slack, and this takes place without the occurrence of pain. Next, when relaxation has become complete, the mucous discharge commences proceeding from the uterus. Finally, a pain comes on and terminates the first stage. That the discharge comes from the uterus is shown by its protruding from the os previous to its appearance in the vagina. Besides, it is only found when the membranes are already separated, and is very often tinged with blood before pains have been felt. A process resembling this form of the first stage may be seen where the other muscular canals are concerned, and perhaps most prominently in the case of the rectum. If the finger or bougie is gently and cautiously inserted past the sphincter ani, and kept there for some time, complete relaxation gradually ensues, a profuse discharge from within the sphincter comes on, and, if the bougie is allowed to remain long enough, the muscular fibres above begin expulsive action.

"The foregoing explanation seems equally applicable to 'wet' cases of abortion or miscarriage in the human subject, except that in such cases healthy ripening of the ovum cannot be said to be the cause of the separation of the membranes."

Dr. Inglis says that he has seen many examples where the first stage has been sudden and short on account of previous separation of these. Three of these he relates.

The following are his conclusions:—

"1st. The easiest form of the first stage of labour is characterized by protrusion of the membranes and a copious discharge.

"2d. These are always direct consequences of separation of the membranes.

"3d. The result of artificial separation seems precisely similar to that of spontaneous.

"The following is the practice I would recommend in regard to separation of the membranes: 1st. That it should always be the initial measure in the induction of premature labour; and that until complete relaxation of the os has resulted from it, there should be no further interference of any other kind; 2d. That when labour has begun without previous separation of the membranes, and these are still adherent, they should always be at once separated, as the best means of overcoming the rigidity of the os, and the painful and prolonged first stage, which almost invariably accompany such a state of matters.

"In the latter of these two cases, if the pains are severe and ineffective, I should be inclined to recommend sedatives to be given at the same time, in the hope of gaining time for painless relaxation to take place.

"With regard to the means of separating the membranes, I have in most cases been able to do it with the finger, though in one or two an instrument was required. In one case, which I have not reported, I could not at first get the finger far enough in to effect any extensive separation; but the small portion

round the os, which was thus denuded, was so relaxed an hour after that I was able to insert the whole finger and separate to the desired extent."

Where he has used an instrument it has been Dr. Hamilton's uterine bolt.

The usual history of primiparous cases seems, Dr. Inglis thinks, to be confirmatory of his views. "The duration of the pregnancy," he says, "being generally shorter, labour commences before the separation of the membranes has occurred, and the first stage is in consequence much slower than in subsequent labours. This is commonly supposed to be the result of the absence of that mucous discharge already referred to, but I think, in reality, chiefly arises from the want of previous separation of the membranes, of which the mucous discharge is only a symptom."

50. *Premature Labour induced by the Use of Fluid Dilators.*—Dr. GEO. H. KIDD, Assistant Physician to Coombe Lying-in Hospital, communicated the following case of this to the Dublin Obstetrical Society:—

"The 'parturition history' of the patient whose case I am about to detail, presents many features of great interest. The first three of her labours took place under the superintendence of Dr. M'Clintock, and the third of these labours is one of those on which his very valuable paper, read before the Obstetrical Society of London—'On Turning in Cases of Disproportion'—is founded. I am indebted to him for the notes of these labours. She has had three labours subsequent to these, and, during them, was under our observation in the Coombe Lying-in Hospital. The history of these is also important with reference to the question of turning, but it is to the mode adopted for inducing premature labour in her last pregnancy that I would at present ask attention. I shall first read Dr. M'Clintock's abstract of his notes of her early labours:—

"F. K. delivered of first child, a boy, December 16, 1856, under chloroform, by perforator and crochet; great difficulty in the operation (which lasted one hour and a half), from the head being above the brim, and the conjugate diameter contracted; recovered well, but subsequently got an attack of pelvic cellulitis of the right side.

"Delivered of second child 1st April, 1858, after a labour of forty-two hours; breech presentation; child, a boy, dead born. When under chloroform, a leg was brought down, and the child thereby extracted; recovered.

"Delivered of third child 12th November, 1859, after a labour of about fifty-six hours' duration, during the greater part of which time she was at home (under care of Surgeon Dirham, who got Dr. Churchill to see her). On admission she had strong pains, the waters were discharged, pulse 110; she was screaming out with excitement and pain, which she referred chiefly to the back; breech very high up; sacral promontory unusually accessible. She was put fully under chloroform, and a leg (left) was brought down without any trouble, but immense difficulty was experienced in extracting the arms and head; the child was a very large male; it came through the vulva with a strong jerk, which snapped across the funis, about four inches from the navel; the fetus was pale and placid, but the heart pulsated. In the course of a few minutes respiration was brought about by the "ready method," warm bath, and restoratives. She and child left hospital well on ninth day. This child was alive and well in April, 1862, when her husband came to tell me she was again in labour, and as the hospital was at that time closed, I sent her to you for admission to Coombe. Of that (fourth) labour, I need not tell *you* the history.—A. H. M'C."

"The fourth labour took place in the Coombe Lying-in Hospital. She had been in labour for many hours before admission; when examined the os was found to be well dilated; the head had not, however, passed through it, being prevented from entering the pelvis by the great prominence of the promontory of the sacrum, and consequent narrowness of the antero-posterior diameter of the brim. The constitutional symptoms urgently demanded delivery, and Dr. Sawyer tried to accomplish this by means of Churchill's forceps. He succeeded in applying the instrument, but the head was so high up that the lock of the forceps, and a great part of the handle, were in the vagina, and we did not deem it prudent to attempt delivery with this instrument, nor did it appear that it would have been possible. The forceps was now withdrawn, and the hand passed

into the uterus, one leg seized, and the child turned; very great difficulty was experienced in bringing the head through the pelvis; and though the heart was feebly pulsating when the child was born, all our efforts to establish respiration failed. The child was a male; the mother made a good recovery.

"On a full consideration of the case we advised her, if she should again become pregnant, to come into the hospital when she was about seven and a half months pregnant, that premature labour might be induced; and in the beginning of May, 1863, she applied to us for that purpose. This was her fifth pregnancy, and on the 29th May the vaginal douche of Kiwisch was applied, as modified by Dr. Sinclair, who kindly assisted us. The douche was used for about fifteen minutes, and caused very marked collapse; it was used once only, but labour soon set in; the pains, however, were very languid, and at long intervals, so that the os was not dilated till the fifth day from the operation. The child, a male, presented with the breech; the second stage was short, and accomplished without difficulty; the heart was pulsating feebly at birth, but respiration was not established. The mother's recovery was slow; there was great debility, though there had been no loss of blood; for several days she had great pain and tenderness over the uterus and iliac regions.

"Early in November last this woman again applied for admission into the hospital. She was then in her sixth pregnancy, her last menstruation having ceased on the 29th of March. She was admitted into hospital on the 22d of November, and we proceeded to induce labour on the 24th, this being the 240th day from the termination of the last menstruation. Assisted by Dr. Ringland, I introduced the smallest of Dr. Barnes's dilators at 12 o'clock on that day, filled it gradually, and in half an hour withdrew it, and introduced the second size. I filled this gradually, and left it in for three hours, during which there were frequent labour pains; when I removed it the os was as large as a five-shilling piece, and the membranes filled well during each pain. The labour seemed fully established, and as there was no apparent reason for hastening the delivery, I did not introduce the largest-sized dilator. After this the pains became irregular and feeble; a stimulating enema was given that night, but without any beneficial effect. Next day (the 29th) the labour made little progress; at 8 P. M. she had a violent rigor; and at 2 A. M., next morning, she became so much excited that Dr. Ringland, who saw her, gave her a full opiate. She slept after this, and in the morning the second stage of labour set in, and she was delivered at 9 A. M., of a rather large-sized, dead, male child; the head presented, and its passage through the pelvis was not difficult. The mother made a good recovery, and left the hospital on the ninth day.

"Dr. Barnes's dilators are fiddle-shaped, caoutchouc bags of three sizes, which are introduced, in a flaccid state, by means of the uterine sound, within the os and cervix uteri, and then distended with water by means of a syringe. * *

"With respect to the death of the child in the case I now record, I confess I am at a loss to account for it. I believe it occurred at the time of the rigor, on the evening of the 29th. Up to this time the child was certainly alive. The second stage of labour had not then commenced; the membranes were not broken, the pains were feeble, and there was no pressure on the child or placenta. I believe the death cannot be charged against the mode in which labour was induced. On the contrary, should I have to treat this woman again, I would be led by the knowledge of the liability of the child to die to use the largest dilator, and urge on the delivery as quickly as I could."—*Dublin Quarterly Journ. Med. Sci.*, Feb. 1865.

' 51. *The Dysmenorrhœa, Metrorrhagia, Ovaritis, and Sterility Associated with a Peculiar Form of the Cervix Uteri, and the Treatment by Division.*—Dr. ROBERT BARNES read before the Obstetrical Society of London (June 7, 1865) a paper on this subject.

The author described and figured the form of cervix uteri which projected into the vagina as a conical body, the vagina appearing to be reflected off at a point nearer the os internum than normal. The os externum was usually minute, scarcely admitting the uterine sound. This (the os externum) was the real seat of constriction. The os internum normally was a narrow opening; and in these

cases of dysmenorrhœa and sterility it was commonly found to be of normal calibre. It was therefore unnecessary to divide it. It was, moreover, dangerous to divide it, on account of the close proximity of the large vessels and plexuses running into the uterus on a level with it. The author maintained that this form of cervix was a cause also of retro- and peri-uterine hæmatocele, and of peritonitis. All these consequences might arise in single women. In the married state the evils enumerated were aggravated, and new ones arose. Women with this peculiarity were generally sterile; and if they became pregnant it was early in life, before the further consequences were developed. These were flexions, deviations, inflammation of the cervix and body, hypertrophy. Discussing the question of treatment, the author showed that dilatation was unsatisfactory; that incision of the os internum, as practised by Dr. Simpson's single bistourie caché and by Dr. Greenhalgh's double bistourie caché, was unsafe and superfluous. He objected to the latter instrument, especially, that it must cut as it was set—that it was too much of an automatic machine, not leaving scope for the judgment of the operator. His (Dr. Barnes's) own instrument, constructed like a pair of scissors, acted on the same principle as Dr. Sims's; it divided only the os externum, so as to open the cavity of the cervix. The part to be cut being first seized between the two blades, the operation was perfectly free from risk. The hemorrhage was usually slight; and a good os was made. He had performed the operation many times, both in hospital and private practice, and was well satisfied with the results. One advantage of incision over dilatation was, that it relieved the engorgement and inflammation. In illustration of the behaviour of the conical cervix uteri under labour, two cases were narrated. In one, the cervix and the os uteri had returned to their original state, although a fœtus of four and a half or five months' development had been expelled through them. In the other case it was necessary to open the cervix artificially by means of the author's cervical dilator and incisions in order to deliver a full-grown child. In both cases pelvic cellulitis followed labour.—*Med. Times & Gaz.*, July 22, 1865.

52. *Influence of Uterine Displacements upon the Sterile Condition.*—Dr. J. MARION SIMS, at the late meeting of the British Medical Association, said that we were all interested in the subject of sterility, when we remembered the fact that every eighth marriage was sterile. He did not propose then to give us a complete paper on the subject, but only to present it in one of its relations, viz., that of its dependence upon misplacements of the uterus. He divided his sterile patients into two classes: 1st. Those who were married a sufficient length of time and did not conceive; 2d. Those who had borne children, but for some reason ceased to do so long before the termination of the child-bearing period. The first he called "natural sterility;" the second, "acquired sterility."

To show the frequency of uterine displacements in this relation, he said that of 250 cases of "natural sterility" that had fallen under his observation, 103 had anteversion, and 68 retroversion; and of 255 cases of "acquired sterility," 61 had anteversion, and 111 retroversion, the anteversions predominating in the first class, the retroversions in the second, the two opposite displacements being almost in inverse proportion in the two classes, and forming about two-thirds of the whole number, being 343 out of 505 cases; which proved beyond question the bearing and importance of these displacements in connection with the sterile condition. He then illustrated by diagrams the normal position and relations of the uterus, explained the various causes and complications of anteversion, whether dependent upon fibroid tumours, elongation of the infra- or supra-vaginal cervix, shortening of the utero-sacral ligaments, or hypertrophy of the fundus. In all these cases, he said, we could not do much for the relief of the sterile condition by merely mechanical means; that our efforts should be directed to seeing that the os tinæ was properly open, that the canal of the cervix was free from engorgement, and that the secretions, both vaginal and cervical, were not poisonous to the spermatozoa. He said that there was one form of anteversion that was easily cured by a simple and novel operation, which he originated some eight or nine years ago. He illustrated this by cases and diagrams. It was as follows: The uterus lies down on the anterior wall of the vagina, and parallel

with it. The fundus is most usually the seat of a fibroid growing anteriorly. The anterior wall of the vagina is greatly elongated, the os tincæ pointing directly backwards. Under these circumstances, he has shortened the anterior wall of the vagina an inch and a half, by denuding a surface a half inch wide and two inches long across the axis of the vagina in juxtaposition with the cervix uteri, and making a similar transverse scarification parallel with the first, about an inch and a half, more or less, anteriorly to it, and then uniting these two transverse cut surfaces by silver sutures, just as we would unite the edges of a transverse vesico-vaginal fistula by them. This necessarily shortens the elongated anterior wall of the vagina, draws the cervix forwards into its normal relations, and as a consequence elevates the fundus. He related several successful cases of this operation, and had seen it followed by conception and child-bearing. He then passed to the consideration of retroversion as influencing the sterile condition, pointed out its varieties and anomalies, and showed how it was to be diagnosed and how replaced. By diagrams, he illustrated various modes of reduction, showed how conception was difficult, and sometimes impossible, in some forms of retroversion, advocated mechanical treatment, pointed out the dangers of pessaries, but advocated their use when judiciously applied under proper circumstances. He prefers a malleable ring, either of block tin or a ring of copper wire covered with gutta percha, and then bent or curved to the proper diameters of the vagina of each patient. He said this was a modification of Hodge's pessary. Under some circumstances he also uses Meigs's ring pessary, made of watch-spring covered with gutta percha. He pointed out the peculiar advantages of each of these, and paid a just tribute to his countrymen, Drs. Hodge and Meigs, who were the earliest advocates of the mechanical treatment of uterine displacements. He said that the great secret of treating the sterile condition when dependent upon retroversion was to adjust a malleable ring which would hold the uterus in its normal position, and which was to be worn always during the act of coition. He explained its philosophy, its efficiency, its safety, and its harmlessness, and related a great many cases in which its use had been followed by conception: one after a sterile marriage of six years, another of ten years, another of fifteen years, and others at various periods, of time after sterile marriages. He also showed how miscarriages, often dependent upon this displacement, are prevented by the use of a properly fitted malleable pessary. He then pointed out the course to be adopted when it was impossible for the patient to wear a pessary, showing why it was so, and what was to be done.—*Med. Times and Gaz.*, Aug. 19, 1865.

HYGIENE.

53. *Diffusion of Fluids by the Atomizer for the Purposes of Deodorization and Disinfection.*—Dr. RICHARDSON explained to the members of the British Medical Association, a process he had adopted for applying the atomizer for the purpose of deodorization. He made a mixture by adding iodine to a solution of peroxide of hydrogen until saturation occurred, and afterwards concentrated sea-salt in proportion of $2\frac{1}{2}$ per cent. In this combination a water was produced like sea-water, and which was rendered active by being charged with free iodine and ozone. The solution, placed in one of Krohne's hand atomizers, could be diffused in the finest state of distribution at the rate of two fluidounces in a quarter of an hour: but in an ordinary bedroom or sitting-room one ounce was sufficient to render the air so active that ozone test-papers were discoloured by it to the highest degree of Moffatt's scale in from five to ten minutes. For charging the sick room rapidly and effectually with active air—in a word, with sea-air—Dr. Richardson said this plan was by far the most effective of any he had known. A nurse could put the apparatus into action at once, and could deodorize, hour by hour, according to the directions of the medical practitioner.—*Med. Times and Gaz.*, August 19, 1865.

54. *Hygiène of Hospitals.*—The following report on the *hygiène* of hospitals was adopted unanimously at a meeting of the Chirurgical Society of Paris, held on December the 14th, 1864. The object of the society, in drawing up the report, was to suggest to government the adoption of its conclusions in the rebuilding of the Hôtel Dieu.

1. A hospital should be situated in an open place, on a dry soil, and on a declivity. The grounds should be extensive. A superficies of 50 square metres, to each patient, is the minimum that should be allowed; and more should be given if possible. This amount must, besides, be *progressively* increased in proportion to the number of patients.

2. The atmosphere of a hospital will be purer in proportion to its distance from densely-crowded quarters. In the centre of towns, there should only be retained hospitals for cases of emergency and hospitals intended for teaching. Healthiness and economy would thus be studied; and large towns, like Paris, would be able to build hospitals on extensive grounds, purchased at a small cost.

3. Good hygienic conditions are easily obtained in hospitals of from 200 to 250 patients. They become nearly impossible in large towns, if more than double this number of patients be brought together. Within those limits, expenses of all kinds are not greater than in the case of more crowded hospitals.

4. As the constituents of the atmosphere mix chiefly in a horizontal direction, the effects of contact and proximity, which constitute overcrowding, and which take place from patient to patient, from ward to ward, from building to building, should be combated by allowing spacious accommodation.

5. It is not only by increasing the cubic space allotted to each patient, but also and chiefly by increasing the superficial area, which is at present insufficient in our civil hospitals, that contagious influences will be efficaciously combated. For similar reasons there should be no increase in the number of stories, each of these producing a more or less vitiated atmospheric stratum. In a rigorous hygienic point of view, more than two rows of patients should never be placed one above the other.

6. It would be illusive to believe that a good allowance of air inside the wards can replace want of space and aëration outside, or to believe that abundant artificial ventilation can supply the absence of one or other of the preceding conditions. Nothing can remedy the insufficiency or the want of natural aëration.

7. Buildings, completely isolated, looking in the same direction, exposed directly to sunlight, to the influence of rain and winds, should be built in one row, or in parallel rows, at wide intervals of from 80 to 100 metres, so as to obtain an efficacious separation, and a free and easy aëration outside.

8. Small wards, containing from 15 to 20 beds, are easily kept under supervision as regards treatment; the patients are less in one another's way; the risks of contagion are less; all impurities are more rapidly taken away. They should be preferred for ordinary cases, without interfering with the special dispositions which are needed for certain classes of disease requiring greater space and *isolation* in separate rooms.

9. The furniture in the wards should offer no obstacle to the circulation of air. It is necessary that the medical attendants should have the right of having the bed-curtains removed, when they think proper.

10. The wards should be separated by the landings and domestic offices. It would be advisable to have one room, in which those patients who can get about might have their meals and sit during the day. The ward would be thus daily, however incompletely cleared.

11. The periodical and regular clearance of wards, and their being left unused for several months, give, in French military hospitals and in foreign hospitals, results which show that a general adoption of this plan is particularly imperative in epidemic seasons. -

12. Arrangements should be made in order to rapidly destroy or remove all smelling matters, excreta, dressings, water which has been used, &c. They should never be kept inside or near wards occupied by patients, and should not be allowed to give off any appreciable exhalations.

13. It is recommended that, besides the central administration of hospitals, a permanent Board of Hygiène and Health be appointed, holding periodical meetings; and that the board consist of physicians, surgeons, managers, engineers, and architects, and be empowered, according to circumstances, to add to their number, with the privilege of voting, all the hospital physicians and surgeons who are not already members of the board. Periodical meetings of the physicians, surgeons, and managers attached to each hospital would give to the administration of hospitals information, which would enable it more safely to proceed with the improvements already attempted.

This last measure, which is in conformity with wishes expressed at the Academy of Medicine, would only be returning to old and useful customs.—*Half-Yearly Abstract*, Vol. XLI., from *Archives Générales de Méd.*, Jan. 1865.

55. *Influence of Social Position on Longevity.*—It is said proverbially that poverty favours longevity, because the poor are not subjected to the bad consequences of luxury and wealth. Dr. MAJER shows the folly of the popular dictum. It has been proved by the researches of Benoiston, de Chateauneuf, de Villerme, Casper, and others, that the value of life is less among the impoverished than the rich. Thus, of an equal number of infants of the same age double the number will die of the poorer than of the wealthier class. Where there is the greatest misery, there is the greatest mortality. According to Casper, the mean duration of life among the better classes of Berlin is fifty years, but among the paupers thirty-two years only. The same writer compares the death-rate of the princely and noble houses given in the *Almanach de Gotha*, with the indigent of Berlin, and he shows that of 1000 infants among the former, 57 die in the first five years; but of the same number among the latter, 345. Whilst the half of the poor only have attained the thirty-second year of life, half of the noble have attained the fifty-second. During epidemics the poorer classes are in an especial manner decimated. That simple well-being prolongs life is demonstrated by the low rate of mortality among persons who “assure” their lives in the assurance offices. A fifth or sixth part of negro slaves die annually. But the mortality among the *free* negroes who serve in the English coloured regiments is only 3 per cent., that of slaves being 17 per cent. The learned professions, followed generally by persons of easy means, have an incontestable influence upon the duration of life. Thus, the mean age of fifty-two French literary men was sixty-nine years. Physicians, according to Dr. Escherich, cannot hope for a long life. At all periods of age they succumb in larger numbers than other professions. But the greatest mortality is during the early periods. Three-fourths die before fifty years of age, and ten-elevenths before sixty. Old men are rare among them.—*Half-Yearly Abstract*, Vol. XLI., from *Annales d'Hygiène Publique*, January, 1865, and *Canstatt's Jahresber.* 1864.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Practical Contributions to Ophthalmic Surgery. By CHARLES E. HACKLEY, M. D., of New York.

Having recently met with some curious cases of "foreign bodies," etc., about the eyelids, I respectfully offer their histories, with some few remarks on them to the profession.

CASE I. M—, a German, æt. forty-two, consulted me about his eye. The upper lid was somewhat swollen and red; on being everted it was found to be covered by granulations, which were red and abundant.

It is not rare to see one eye suffering from granular conjunctivitis, while the other is comparatively free from it; and this happens (according to my observation) almost always in the right eye; it probably being rubbed most frequently with unclean hands, etc. Still there was an unusual appearance about the eye in question, causing me particularly to inquire into its history. The eye had been sore about six months from *no known cause*. The lid was fully everted and touched with a ten-grain solution of nitrate of silver.

At the next visit, the condition was the same; suspecting that there might be some foreign body present, a probe was passed behind the cartilage, and a white body brought to view at the internal canthus, which, on removal, proved to be an "eye-stone." The patient then remembered that about six months previously a foreign particle had entered his eye; an "eye-stone" was sent in after it, as a weasel is sent in a hole after a rat. He supposed the stone had dropped out while he slept; a conjecture confirmed by his wife, who said she had seen it in the bed.

After the removal of this body the eye soon recovered under the use of astringents.

Although chagrined at the time that this foreign body, free under the lid, had escaped my observation at the first visit, I have since met cases that had, at various times, been under the treatment of different surgeons who had failed to find the cause of their "granular lids."

CASE II. G—, a boy, æt. sixteen, was brought for treatment to the "Wills Hospital," in Philadelphia, some years since, when I was Resident Physician there. From under the right upper eyelid protruded a mass of granulations, which were so painful that for examining and removing them it was necessary to give anæsthetics. The attending surgeon was snipping off the granulations with the scissors, when "something hard" was felt between the blades; on being seized and extracted by forceps, this "something" proved to be an *entire beard of wheat*, which, on returning to consciousness, the boy was quite certain must have entered the eye two months previously while he was playing in the harvest field.

After the removal of the cause of irritation the lid quickly recovered under cold water applications.

CASE III. S——, æt. sixty-one, a ship-carpenter, presented himself to be treated for a granular state of the right eyelid, which, by the swelling and lachrymation it caused, interfered greatly with his vision. The appearance of this lid reminding me of that in Case I., and I inquired into its history. The patient stated that some six months previously he had been chopping up a rotten plank, and a piece of it, being broken off, struck him over the eye, since which time it had been sore. The patient had applied to "his doctor" for treatment; the lid had not been everted, but eye-drops had been given, to be used at home.

On passing a probe behind the upper cartilage, a piece of wood as large as a coffee grain was brought out; after which, under the use of an alum wash, the lid resumed its natural appearance in about a week.

CASE IV. H. F——, a German, æt. twenty-one, complained that fourteen months previously, while walking along, he was struck on the left eye by a piece of bottle, which had been tossed out of a window; since which time his eye had been sore.

On examination it was found that a large cicatrix existed in the left upper lid, and that this hung nearly over the cornea. On raising the lid a cicatrix was found in the cornea, and a pediculated mass of granulations hanging down behind the lid. From the outside of the lid, a foreign body could be detected near the external canthus.

The granulations were snipped off, and a communication between their point of origin and the foreign body was sought for, but none was found. I then made an incision from the outer surface, and removed a piece of glass about three lines long by two wide and one thick. This body, having for fourteen months escaped the notice of various surgeons, had caused no suppurative inflammation.

The above cases show how long bodies which do not easily decompose may remain in contact with living tissue without causing serious inflammation. And they also show how easily diseases may sometimes be removed when we know the original cause.

The next case can hardly be classed with the above, and is here given merely as a curiosity in ophthalmic surgery.

CASE V. L. W——, a boy æt. three years, from Newark, N. J., was brought for treatment, August 2, 1865. Since birth he had a tumour under the left upper eyelid; from the lower part of this tumour were growing about forty or fifty hairs over two inches long, and of a bright red colour (same as hair of his head). They hung from the external canthus of the eye over the cheek, and the tears were constantly dripping down from them. The mother said she had several times cut the hairs off even with the eyelashes, and had done so two weeks previously.

On everting the upper lid and making traction by the hairs, the tumour from which they grew proved to be quite mobile. I easily dissected it out with the curved scissors, and found it to be about the size of a bean, composed mostly of fat, with a chalky mass about as large as a grain of wheat in it.

Tumours of like nature have been reported before, but those that I have seen mentioned were spoken of as growing from the sclerotic.

I have seen several *mole*-like tumours growing from the sclerotic in the vicinity of the cornea, and, on one occasion, assisted Dr. J. H. Hinton, of this city, to remove such a tumour from that position in a woman about fifty years of age. She said two hairs had *formerly* grown from it, but on being plucked out they had not returned.

On the Local Application of the Subnitrate of Bismuth to Prevent Pitting in Variola. By WILLIAM R. HAMILTON, M. D., of St. Augustine, Knox County, Illinois.

About the 10th of February, 1864, my wife, æt. thirty-seven, rather plethoric and somewhat corpulent, contracted smallpox from an unknown source. The premonitory symptoms were very severe, and in due course of time the eruption appeared. As soon as the pock filled on the face I applied the creta preparata as an absorbent, first smearing the surface with sweet oil. After one or two applications of this, and reflecting on the effects of the subnitrate of bismuth when applied locally to ulcers, I then combined the creta preparata and subnitrate of bismuth in equal quantities, and applied twice a day, after lubricating the face with sweet oil as before. The face was also covered with a black masque. The disease passed through its regular stages of maturation and decline, without any very untoward symptom; and there are but very few marks on the face, the only part to which the medicine was locally applied. It would be proper to state that I had vaccinated my wife only a few days before symptoms of variola manifested themselves; and the vaccine did not show itself until after the smallpox. I vaccinated a number of other persons from the same scab that I had used for my wife, and they all passed through the regular stages of vaccinia.

The second case was that of J. G. W., a native of Alabama, æt. seventeen, light hair, fair skin, and blue eyes, who caught the infection on the passage from his native state to Ohio, where I at that time resided (1864). He had no knowledge of having ever been vaccinated, nor, on the most minute search, could I find any evidence of it. His attack was distinct smallpox, except on his face and hands, which was confluent; indeed, there appeared to be but one pock from his eyes to his chin, as well as on the dorsal aspect of his hands. On the whole, his attack was severe, but did not cause any unusual symptoms. In this case I applied the subnitrate in its pure state to the face and hands twice a day, after lubricating the parts with sweet oil, as in the other case; and there is scarcely a pit to be found on his face, and on his hands not one. The face was covered as in the other case, but his hands were left uncovered.

There seemed to be another advantage from the application of the bismuth, namely, the scabs on the parts to which it was applied, came off two or three days earlier, and, as it seemed, more readily than from other parts.

Poisoning by Veratrum Viride. By J. B. BUCKINGHAM, M. D., of Bloomville, Seneca County, Ohio.

The case of poisoning by veratrum viride recorded in last No. of this Journal, page 284, calls to mind a similar case which occurred some years ago in my practice, which seems to me may be worthy of note.

H. C——, an adult, who had been taking fluid extract of valerian for some nervous derangement, stepped into a drug store, picked up a bottle, thinking it was valerian, and took a swallow and passed it to a friend (a lawyer) remarking, take some of this, it will improve your oratory. The latter, being ambitious, also took a swallow, and soon after left the store. In about half an hour afterwards, I was hastily summoned to see the orator, whom I found in the following condition: Almost speechless, retching and vomiting incessantly, bathed in profuse cold perspiration, pulse scarcely perceptible in the radial artery. I administered at once a full teaspoonful of laudanum, after which there was no more vomiting,

pulse increased in strength and volume, followed by a quick recovery. This was the only medicine given, whereas in the case of H. C—, who took no laudanum, the vomiting continued for some hours, with total loss of speech and locomotion for some time.

The dose taken by each must have been a full teaspoonful, about the ordinary dose of valerian. I am fully satisfied that the one to which I was called first must have died had it not been for the timely administration of laudanum.

July 18, 1865.

DOMESTIC SUMMARY.

Injuries of the Nervous Centres from Explosion of Shells, without Wound or Contusion.—Dr. GEO. BURR, Professor of Anatomy in Geneva Medical College, reports (*New York Med. Journ.*, Sept. 1865) the two following interesting cases:—

“CASE I. Capt. R. P. W., assistant adjutant-general of General Bartlett’s brigade, first division, sixth corps, during the attack on our line at Charles City Cross Roads, Virginia, was severely stunned by the explosion of a shell in his immediate vicinity. I did not see him immediately after the occurrence, but when he came under my notice there was hemiplegia—the paralysis extending not only to the inferior and upper extremities, but also to the muscles of the neck and tongue. His articulation was difficult, his tongue thick, and his voice much changed. He was granted leave of absence to come to this State, and while *en route* for home his symptoms seemed to be aggravated and the paralysis to increase. It was several months before he was sufficiently restored so as to be able to resume his duties.

“CASE II. Adjutant G., of the —th regiment N. Y. S. Volunteers, experienced a similar casualty on the same day, a shell bursting near him. He rode to where I had established a temporary field hospital, and, although retaining his seat in the saddle, he was in a great measure helpless. I assisted him to dismount, and to a place where he could lie down. He appeared stunned and bewildered, unsteady in his movements, and half unconscious of his whereabouts. The fire of the enemy, after a while, made it necessary for us to remove from the place we were occupying, when I placed Adjutant G. upon his horse, and he rode to the rear. I have never seen him since. I subsequently learned that he made his way to the James River, and, without obtaining leave of absence, went on board a transport, and left for his home in this State. In due time his absence was noticed, and he was directed to return to his regiment; but no considerations could induce him to do so. He disregarded all his obligations as an officer, forfeited a well-earned reputation, and was finally dismissed the service, for continued absence without leave.

“CASE III. The following account has been kindly furnished me, at my request, by Captain M. B. Robbins, 109th regiment N. Y. Volunteers. The detail of the symptoms, and the abnormal sensations which he describes, will readily be recognized as coming from injury of the nerves.

“‘I was injured about 3 o’clock P. M., June 2d, 1864, at or near Bethsaida Church, Virginia, by the explosion of a $3\frac{1}{2}$ inch shell, five or ten feet above my head. We were supporting a battery in third line of battle. I was lying partly on my face, partly on my right side; was carried to the rear insensible, where I remained until 8 A. M., June 3d, when I awoke, as I supposed, from a good night’s rest. I saw several persons near me, their lips moving. I could hear nothing. Attempted to rise; found myself helpless; when I experienced a pricking sensation in my right leg and arm, severe pain between the shoulders and through the upper part of the lungs. I saw a member of my regiment at a distance; tried to speak; did so with great difficulty; a soldier called to him for me; he came to my assistance, and had me taken to the field hospital, where

- I remained until the 6th; then was sent to the White House; from thence to Annapolis, Md.; remained there until July 15th, when I rejoined my command, and was granted "leave of absence." After my arrival home my general health commenced failing. August 13th.—My leg and back (spine) were in as poor a condition as at any time since my injury. Since this time I have been gradually improving. For three months or more I had a severe pain on the left side of my head—a spot as large as a dime—like the driving of a nail into the head. I feel this at times yet, when tired or excited. At the present time (Jan. 7, 1865) the muscles of the leg, above the knee (front), are tender and sore; also those below the knee. When walking, I am unable to bend the knee naturally, and feel a cutting sensation through the calf of the leg. I have sharp, darting pains through the upper part of the chest. My appetite has been excellent most of the time, and digestion good; however, it has seemed to do me but little good. My system is very weak; the least exposure to the cold or wet confines me to my room.' I will add that, in Captain R.'s case, the paralysis was distinct and well marked, affecting the right leg and arm.

"In neither of the preceding cases was there wound or contusion. The violence affecting the nervous centres operated through the medium of the atmosphere at a greater or less distance."

In regard to Case II., Dr. B. remarks, "It presents some peculiarities upon which I wish to comment; and the point is, the complete change which the explosion produced in the moral and affective faculties of the man. He had acquitted himself creditably in the battles of the first Bull Run, West Point, and Gaines' Mill—had risen from the ranks to a lieutenancy, and had been appointed adjutant of his regiment; and no stain of cowardice or other unofficer-like conduct was upon his record down to the time of his receiving the injury. His subsequent course indicates a complete perversion of the character he had formerly borne—a change not only equal to, but strongly resembling what is seen in cases of derangement from ordinary causes; and one inducing movements as uncontrollable, and as much beyond his power to restrain, as were the muscles of the palsied limbs in the other cases beyond the power of volition to excite them.

"The exigencies of the service, without doubt, required that the place of this officer should be supplied with another; but I am far from believing him culpable in the highest degree for his refusal to return to duty. That his mind was not in a sound condition is by no means improbable; on the contrary, the sudden transformation of the man, the subsequent total disregard of consequences, and of every consideration affecting his reputation which he exhibited, closely simulates well recognized *irresponsible* conditions of the human intellect."

Ovariectomy.—Dr. GEO. T. ELLIOT, JR., gives (*New York Med. Journ.*, Sept. 1865) a very elaborate report of a case of multilocular, exogenous, ovarian tumour in a woman thirty years of age, which he removed on the 1st of June last. The tumour was entirely free from adhesions, had a small, thin, flat pedicle, and after removal weighed seven pounds. A three-strand white silk double ligature was passed through the base of the pedicle with an awl-shaped needle, and tied in both directions, after which the pedicle was cut. The ligatures were cut close to the stump, and the pedicle returned into the abdomen. The incision in the abdominal parietes was about five inches.

The patient died on the tenth day; the post-mortem did not satisfactorily explain the cause of death.

Bee Bread as a Diuretic.—Dr. JAS. S. WHITMIRE states (*The Chicago Medical Examiner*, September, 1865) that he has found the bee bread¹ to be a most powerful diuretic. He made the discovery accidentally. Having bought a quantity of honey in the comb, he feasted liberally on it with his family for four or five weeks, and noticed that his secretion of urine was largely increased. Fearing that his kidneys were diseased, he examined for albumen without finding any, and afterwards for sugar by the taste, when the taste of bee bread was

[¹ The pollen of flowers collected by bees as food for their young.—ED.]

detected and its odour was also distinct. He then learned that his family were similarly affected.

To verify his suspicion as to the cause of his increased urinary secretion, he selected, he says, "some of the oldest comb that contained the greatest quantity of the bread, and separated it from the honey and comb; then, after abstaining a week from the use of my favourite sweet, and getting quite over my renal disease, as well as my unnecessary alarm, I partook of the bread, without the luxury of the honey, to the extent of 3j three times per day, when, as I was expecting, back came the enormous secretion, but this time producing an entirely different effect upon my mind, so that I was now prepared to investigate the effects a little more at length. I continued taking 3iij per day, for about a week, during which time I voided from four to six fluid pounds per day, the difference being the *greatest when I was at some out-door exercise*. When I remained quiet, in my warm office, there was from one to one and a half pounds less secretion than when exercising, I also repeated the same experiment on my children, and found, to my entire satisfaction, that this article possesses most valuable diuretic powers, and there seemed to be no disagreeable symptoms following its use, excepting a slight degree of flatulency and a looseness of the bowels produced, the latter of which is not, unfrequently, very desirable, particularly in dysuria, where there is irritation of the neck of the bladder and urethra, or, even in strangury, where there is absolute inflammation of the urinary passages. This, to me, is the more evident, from the enormous quantity of urine secreted, and, consequently, any irritating quality that it might contain would be so diluted as to be rendered entirely mild and inoffensive to the delicate structure of the urinary passages.

"One advantage this article has over many others of its class is, that it is entirely palatable and inoffensive to the stomach, producing no irritation or nausea of the latter organ."

FISKE MEDICAL PRIZE QUESTIONS.

The Trustees of the Fiske Fund, at the Annual Meeting of the Rhode Island Medical Society, held in Providence, June, 1865, gave notice that no awards had been made on the questions proposed by them for premiums for the present year.

They propose the following subjects for 1866:—

1st. VACCINATION. WHY DOES IT EVER FAIL TO GIVE PERFECT PROTECTION?

2d. PYÆMIA; CAUSES, PATHOLOGY AND TREATMENT.

For the best dissertation on either of these subjects the Trustees will pay One Hundred Dollars.

Every competitor for a premium is expected to conform to the following regulations, viz:—

To forward to the Secretary of the Trustees, on or before the first day of May, 1866, free of all expense, a copy of his dissertation, with a motto written thereupon, and also accompanying a sealed packet, having the same motto inscribed upon the outside, and his name and place of residence within.

Previously to receiving the premium awarded, the author of the successful dissertation must transfer to the Trustees all his right, title, and interest in and to the same, for the use, benefit, and behoof of the Fiske Fund.

Letters accompanying the unsuccessful dissertations will be destroyed by the Trustees, unopened, and the dissertations may be procured by their respective authors, if application be made thereof within three months.

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